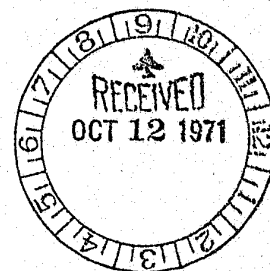


NOV 1 1971-2

ULTRAVIOLET DETECTION OF METAL TRACES

Trace Metal Detection Technique



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34019
READING ROOM

Minnesota Bureau of Criminal Apprehension
Department of Public Safety
Saint Paul, Minnesota

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34019

PREFACE

During the course of government-sponsored research, it was discovered that surfaces such as a persons hands or clothing could be covered with a test solution, allowed to dry, and then examined under ultraviolet light to determine whether there had been recent contact with metal objects.

The project "Ultraviolet Detection of Metal Traces" was conducted by the grantee in cooperation with the Center for Criminal Justice Operations and Management, Law Enforcement Assistance Administration, Department of Justice, Washington, D. C. for the purpose of evaluating this procedure and disseminating the resulting information to law enforcement agencies throughout the United States.

The author wishes to acknowledge with special appreciation the following persons:

Dr. Edmund Golding, Chief, and Mr. Marc Nerenstone, Operations Research Analyst, of the Center for Criminal Justice, Law Enforcement Assistant Administration, for their extensive guidance and assistance throughout the project; and Mr. Milton Flohr, Acting Laboratory Director, and Mr. James Lansing and Mr. Barton Epstein, Crime Laboratory Analysts, of the Minnesota Bureau of Criminal Apprehension Laboratory, for their able assistance during the project.

SUMMARY

The "Ultraviolet Detection of Metal Traces" project consisted initially of an evaluation of the "Trace Metal Detection Technique" under controlled laboratory conditions. Test subjects held metallic objects (primarily guns), for various periods of time. The subjects' hands were treated with a test solution and observed by four different observers each of whom utilized four different ultraviolet light sources. Time delay periods used were zero, one and two days. Observation record sheets were filled out for each observation. These record sheets were submitted to an independent statistical analyst for data analysis.

Due to limitations of time the laboratory evaluation was not sufficiently extensive to allow a statistical basis for firm conclusions. The success of the technique was also found to relate to variables such as length of contact, pressure and moisture (sweating).

It was found that metal traces do not readily transfer to the hands of certain individuals. The period of time between contact and testing was found to be an important factor. The pattern of metal traces developed was found to be important in the interpretation of the results. The performance of trained observers in recognizing and identifying patterns of metal traces was found to be greatly superior to the performance of observers with minimal experience. Metal traces were demonstrated in a majority of cases when the tests were conducted without delay after a metal contact time of two minutes.

A series of workshop/seminars were held October 26 - 27 - 28 - 29, 1970 in Bloomington, Minnesota. The Trace Metal Detection Technique was presented to 82 representatives from law enforcement agencies in 39 states.

Two written surveys of the participating agencies were conducted. An initial questionnaire was sent out in January, 1971 and a second questionnaire was sent out in August, 1971. The responses indicated that the Trace Metal Detection Technique was found to be of value in approximately 50% of the criminal investigations in which it was used.

The results of the Ultraviolet Detection of Metal Traces Project indicate that the Trace Metal Detection Technique can provide valuable assistance to law enforcement in the investigation of certain criminal cases. The limitations of the technique and the number of variables involved demand that it be used by persons with extensive experience in its use and that discretion be taken in the interpretation of results.

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INTRODUCTION

The Trace Metal Detection Technique consists of treating the surface to be tested with a solution of 0.2% by weight 8 - Hydroxyquinoline (C.P. Grade) in isopropyl alcohol (C.P. Grade) and viewing the surface in a darkened area under ultraviolet light. The reagent fluoresces under ultraviolet light. Metal traces either fluoresce in a different color or appear black against a luminous background.

Initially chemicals, ultraviolet lamps and miscellaneous laboratory equipment were obtained and an ultraviolet fluorescence room was prepared. Numerous laboratory tests of the Trace Metal Detection Technique were conducted to familiarize and train laboratory personnel in the use of the technique. A series of tests utilizing the test plan to be used in the formal laboratory evaluation were conducted at a Highway Patrol Training School. Twenty three test subjects were used in this study.

Arrangements were made to employ college students as test subjects for the laboratory evaluation study.

The services of an independent statistical consultant firm "Stephen K. Plasman and Associates, Inc.", Minneapolis, Minnesota were obtained for statistical treatment of the data resulting from the Laboratory study. Robert S. Hodges, Ph.D., Vice President of "Stephen K. Plasman and Associates, Inc." participated in planning for the laboratory study. Arrangements were made for Dr. Hodges to participate in the workshop/seminars.

Facilities for the T.M.D.T. Seminars were obtained at the Decathlon Athletic Club, Bloomington, Minnesota. Seminars were scheduled on October 26, 27, 28 and 29.

One thousand copies of the Law Enforcement Assistance Administration Manual entitled "Trace Metal Detection Technique in Law Enforcement" were printed for dissemination to law enforcement agencies.

Ten ultraviolet lamps were purchased and distributed for use in field testing by the New York City, Washington, D. C. and Philadelphia Police Departments.

LABORATORY EVALUATION

A laboratory evaluation study of the Trace Metal Detection Technique was conducted. A test plan*, devised to explore some of the capabilities and limitations of the Trace Metal Detection Technique, was used.

The test design utilized 16 persons and in most cases right and left hands were treated separately. Treatment consisted of no metal contact, holding various weapons for a total time of two minutes during which time five shots were fired, holding weapons and other metallic objects for a total of ten minutes and pulling on a revolver barrel or butt for three minutes.

Subjects were observed by each of four trained observers utilizing four ultraviolet lamps (laboratory shortwave, laboratory long wave, portable short wave, portable long wave). Each observer recorded his observations on an observation record sheet.** A total of 16 observations were thus made of each hand of each of the test subjects.

Three replicates of the test design were conducted. The time delays used for these replicates were zero, one and two days. The resulting data was submitted to Dr. Robert Hodges of "Plasman and Associates" for statistical analysis. The results of this analysis were presented at the Trace Metal Detection Technique Workshop/ Seminars and have been submitted to the L.E.A.A.

During the conduct of the laboratory evaluation study a 16 mm movie (15 minutes) was prepared for training purposes.

* A copy of the test plan is attached as Appendix A.

** A copy of the observation record sheet is attached as Appendix B.

Photographs, both color, and black and white, were taken of trace metal patterns.

Copies of these photographs were used at the seminars and have been submitted to the L.E.A.A. The following data for photographic procedures was developed:

Photography for T.M.D.T. Program

Camera - Bronica S-2

Lens - 75 mm Auto-Nikkor

Lights - Two UVS-11 lamps 8" from subject. Lamps 45° to subject.

Filter - 2A

Film - size 120

High Speed Ektachrome

Exposure - 8 sec. @ F/2.8

Developer - E-4 Process

Development Time - 1st developer

12 min. other times as per
instructions

Royal-X Pan

2 sec. @ f/2.8

HC-110 Dilution "A"

7 min. @ 70°F

Royal-X Pan Enlargements

Enlarger - Omega

Lens - 100 mm f/4.5

Paper - Ektamatic SC Grade F

Filtration - PC-2

Miscellaneous Notes

"Pushing" of high speed Ektachrome film appeared to shift color balance to yellow side of spectrum. It is possible to compensate for this with a CC10B or CC20B filter with slight increases in exposure times.

Trace Metal Detection Technique Test Kits were prepared for distribution to law enforcement representatives attending the seminars.

WORKSHOP / SEMINARS

Four one-day workshop/seminars were held at the Decathlon Athletic Club in Bloomington, Minnesota on October 26, 27, 28 and 29, 1970. The following program was presented:

0900 - 0920	Welcoming Address	Dr. Golding, L.E.A.A. Marc Nerenstone, L.E.A.A.
0920 - 1000	Demonstration of T.M.D.T.	Ed Sayles, L.E.A.A. Ward Green, L.E.A.A. Jerry Brown, L.E.A.A. William O'Donnell, L.E.A.A. Charles Good, L.E.A.A.
1000- 1030	Report of Laboratory Trials and Results	Jim Rhoads, B.C.A. Lab Jim Lansing, B.C.A. Lab Barton Epstein, B.C.A. Lab
1030 - 1045	Coffee Break	
1045 - 1115	Report of Police Department Field Trials	Stanley Bogdan, Boston P.D. Lab
1115 - 1200	Discussion of Legal Aspects	Professor Livermore, University of Minnesota
1200 - 1330	Lunch	
1330 - 1530	Workshops Distribution of Kits	

A total of 82 representatives from 75 L.E. agencies in 39 states were in attendance.*

*A roster of persons attending is attached as Appendix C.

SURVEY NO. 1

In January, 1971 survey forms were submitted to 83 persons who attended the workshop/seminars. Fifty-nine of the survey forms were returned.*

The responses to the survey indicated a genuine interest in the Trace Metal Detection Technique by the persons attending the seminars. Fifty of the fifty-nine persons responding had practiced the technique in actual criminal investigations. Fifty-seven persons had demonstrated the technique to 1723 people and 41 persons had taught the technique to 287 people.

Responses to the question asking for an opinion of the Trace Metal Detection Technique were favorable. There were only three forms giving no opinion and no replies indicating an opinion that the Trace Metal Detection Technique was of no value.

Some of the opinions expressed indicating belief in the value of the Trace Metal Detection Technique are listed as follows:

1. I believe it has great potential as an investigative aid.
2. A very good investigative aid.
3. We use it on all shooting cases and some robbery offenses.
4. The T.M.D.T. is a very useful investigative aid and while we have not testified in court as of yet, I feel it will be accepted by our courts.

*A copy of the survey form with a tabulation of the responses received is attached as Appendix D.

5. This technique does merit the full knowledge of the officers in the Detective Division, and the capabilities should be known by all officers. This technique of course is limited but certainly would be most valuable in specific cases.
6. Wonderful new technique. Needs more scientific development and testing.
7. I believe it to be an additional aid to investigations.
8. Believe the T.M.D.T. is another scientific and indispensable investigative tool.
9. It has a definite place in police work. We are presently using it in suspected gunshot cases, occasionally in conjunction with primer residue tests.
10. I am impressed with the possibilities of the T.M.D.T. and intend to use it at every opportunity.
11. This technique is undoubtedly an invaluable investigative aid to a law enforcement agency, however, I feel at this time there has been inadequate field research.
12. Very good even with out limited knowledge and use.
13. Shows possibilities as a valuable investigative aid.
14. In our opinion it is a very useful tool.
15. I think it is very valuable to Police Departments.
16. Very good.
17. Shows possibilities as a valuable investigative aid.
18. This technique definitely has possibilities for developing into a good investigative aid.
19. In some cases I believe it will be an excellent aid to investigations.

20. At this time I feel that the technique has a very definite future in law enforcement and I am very anxious to proceed with research into its use.
21. It has a great deal of potential if used by someone who understands its limitations and applies discretion in its use.
22. Definite investigative value - high potential.
23. Excellent potential. Needs more investigation and statistical evaluation for evidential value. Can be useful in screening tests.
24. I think it may be useful in certain applications. Disadvantages are the length of time objects must be held and the amount of pressure required. A great deal of caution should be used in interpreting positive findings.
25. Good for metal traces when object held for sufficient time.
26. We found that while using T.M.D.T., although it was not conclusive, it assisted the investigator in making a decision.
27. A great help in many investigations. Very questionable in court.
28. Cautiously optimistic.

Some of the opinions expressed indicated a less optimistic opinion of the T.M.D.T. are as follows:

1. It is an investigative tool that must be used with caution.
2. Limited value.
3. Requires considerably more use in actual cases before any definite opinion can be stated.
4. Tentatively, I would say that the technique is somewhat tenuous with a great many variables tending to obscure or even negate any conclusions reached.

5. Has some value as an investigative lead but reliability is questioned.
6. Of uncertain value. In the ten criminal cases, we failed to produce the desired results with subjects suspected in murder cases and victims in suicide cases.
7. Except for extreme test conditions results have been for the most part inconclusive or negative.

All of the opinions of the workshop/seminar method of introducing new law enforcement technology were favorable. Many of these responses were very enthusiastic. Some of the responses given were as follows:

1. I think that it is the best and cheapest way to introduce new methods to all law enforcement agencies.
2. I found that this was a very efficient method of introducing this new innovation in crime detection. The instructors were very efficient and there was no lost time due to the efficient manner in which the seminar was conducted.
3. An excellent way to introduce new technology.
4. I agree wholeheartedly with this method of introducing new and useful information.
5. I believe this is a very effective approach to instruction.
6. I was very impressed with the manner in which this technique was presented and feel that this gives police departments an opportunity to evaluate new technology and determine if it suits their needs.
7. Excellent.
8. This is a very effective method.
9. I believe it is the best possible way to get the information to the greatest number of enforcement agencies in the shortest possible time.

10. The workshop/seminar method, even though quite costly, is very effective. The method of presentation, small group presents better communication thus better understanding.
11. Method more than sufficient.
12. Outstanding. The workshop/seminar method allows a large number of concerned personnel the opportunity to receive new procedures and methods, enabling them to return to their departments and apply the methods to actual operation. Also I felt that the liaison and personal contact with contemporaries throughout the United States was and is invaluable in promoting professional standards and operational understanding.
13. I feel that this workshop/seminar method was invaluable in introducing this type of technology to L.E. agencies.
14. This in my opinion is the best way to introduce new law enforcement technology.
15. Method of distribution very fast and effective. Very helpful.
16. Very informative, offering first hand experience with new techniques.
17. A very effective method.
18. I have attended many lecture-seminars but do honestly believe that the workshop type seminar which was held in Bloomington was the most informative type which I have ever attended due to the fact that the participants are given an opportunity to become involved in the subject matter at hand.
19. Excellent presentation.

20. I think it's a very good idea. It gives the opportunity to evaluate techniques and results found by individuals who have devoted considerable time and effort to developing new methods.
21. I thought the program was excellent and very informative.
22. A job well done in the very short time allotted.
23. Excellent means of communication.
24. A workshop/seminar method of introducing new law enforcement technology is very valuable as it enables police departments to become aware of new techniques which could easily be overlooked.
25. Effective.
26. Excellent way of presenting new methods and techniques related to scientific crime detection.
27. Excellent. It gives sufficient opportunity to take part in the actual method being demonstrated with the concomitant advantage of clearing any immediate questions which come to mind.
28. A very good method of instruction. All of my questions were answered and I left the seminar with a good understanding of the subject matter.
29. This is an excellent way of introducing new methods and techniques.
30. This is an extremely fine idea. It brings a group of knowledgeable people together in a relaxed atmosphere and I think secures the success of the program; that is, to disseminate information and stimulate thought and work in a particular area.

SURVEY NO. 2

In August, 1971 a second survey form* was submitted to the 82 persons attending the Trace Metal Detection Technique workshop/seminars. This survey was designed to obtain more specific information regarding the use of T.M.D.T. in actual criminal investigations. At the time of this report 36 survey forms had been returned. Twenty-seven of the 36 persons returning the survey had utilized the Trace Metal Detection Technique in actual criminal investigations. These investigations included 60 homicides, 287 suicides, 29 aggravated assaults and 11 burglaries. Results indicated the T.M.D.T. was of value in approximately 50% of these cases.

*A copy of the survey form with a tabulation of the responses received is attached as Appendix E.

PERSONAL SURVEY

On August 30, 31, September 1, 2 and 3, 1971, a personal survey of participating law enforcement agencies in St. Louis, Missouri; Charlotte, North Carolina; Dallas, Texas; San Francisco, California and Sacramento, California regarding their use of the Trace Metal Detection Technique in criminal investigations was conducted.

The opinions of persons contacted were either enthusiastic or revealed reservations concerning the value of the utilization of Trace Metal Detection Technique. The fact that the results of the technique were inconclusive in some cases led to a reluctance to utilize it as a routine investigative procedure.

There were some differences of opinion expressed as to whether the T.M.D.T. should be administered by scientific personnel or by investigative personnel. In most departments having laboratories use of the Trace Metal Detection Technique is a function of the laboratory. Some laboratory personnel felt that the technique should be used only as an investigative tool and that its administration was more properly a function of investigation.

The volume of routine duties has prevented many departments from conducting the desired evaluation of the Trace Metal Detection Technique. It was felt by those persons contacted that further evaluation was necessary.

Those departments having utilized the T.M.D.T. in a number of cases expressed their intention of continuing its usage. The results of the survey indicate that the knowledge of the potential and possibilities of the Trace Metal Detection Technique will result in its continued usage and will establish it as a valuable scientific investigative tool for law enforcement.

TEST PLAN FOR THE LABORATORY ASSESSMENT OF THE TRACE METAL DETECTION TECHNIQUE

BY THE STATE OF MINNESOTA BUREAU OF CRIMINAL APPREHENSION

I. PURPOSE

The purpose of this test program is to explore some of the capabilities and limitations of the Trace Metal Detection Technique for determining whether or not individuals have handled metal weapons and for identifying which particular weapons have been handled.

II. DESCRIPTION

This technique employs a special detecting solution, an ultraviolet light, and a darkened viewing area. The object to be tested, such as suspects' hands or clothing, is covered with the test solution, the solution is permitted to dry, and the coated surface is viewed in the darkened area under ultraviolet light. The solution may be sprayed on the surface to be tested or the object may be dipped into a container of the solution. Under ultraviolet light, the coated surface fluoresces; those portions of skin or cloth which have metal traces upon them either fluoresce in a different color or appear black against a luminous background. Metal traces may be deposited upon subjects' hands by activities such as firing a gun, wresting a metal bar from someone else's hands, or using tools to fix an automobile. The technique detects contact with metal, not the commission of a crime. Under appropriate conditions, the technique is sensitive enough to reveal contact with metal which may have occurred several days previously.

III. MATERIAL REQUIRED

Test Solution	3 gallons
Plastic spray bottles and stems, Fisher Scientific Co., Plax #2	½ dozen
Ultraviolet light sources, Ultra-Violet Products, Inc. San Gabriel, California	
Short wave portable: M-14 Mineralite lamp	one
extra J-333 battery pack	one
Short wave laboratory: UVS-11 Mineralite lamp	one
J-124 UV Lamp Stand	one
Long wave portable: M-16 Blak-Ray lamp	one
extra J-333 battery pack	one
Long wave laboratory: UVL-21 Blak-Ray lamp	one
J-124 UV Lamp Stand	one

Room which can be darkened to inspect subjects

Table and chairs for observers

Standard data sheets for recording observations 1600
(400 per observer)

Rubber name stamps and stamp pads for observers 4

IV. PERSONNEL REQUIRED

Personnel required for this test will include a Project Director to ensure that all test procedures are properly followed and the data is properly collected; laboratory technicians who will apply the test solution, inspect the subjects, and interpret the results of their observations; one or two people to direct and assist subjects in all phases of the test program; and one or more trained analysts to observe the test procedures, analyze the data and prepare reports.

V. TEST DESIGN

The design for a full replicate of the test program is presented in the subject-treatment matrix. The design requires sixteen people and in most cases left and right hands are treated separately. Five replicates of the design are to be run; the subjects are to receive the indicated treatments, and then, after the prescribed time delay, they are to be inspected by the Trace Metal Detection Technique. The time delays between treatment and inspection shall be: 0, 1, 2, 3, and 4 days; thus eighty subjects will be required for the five replicates.

In addition to the full replicate described above, three additional subjects are to be selected, each is to receive treatment three but one will be wearing cotton gloves, one rubber gloves and one leather gloves while the weapons are being fired. These three are to be inspected with the 0 days delay group.

All of the subjects shall be chosen from people who do not normally shoot or handle fire arms; subjects for the "clean hands" categories may be men and women students, clerks, typists, social workers, lawyers, or anyone who does not handle metal extensively as part of his job or hobby. These subjects will be asked to refrain from firing weapons entirely and to refrain from handling metal any differently than their normal practice from the time of treatment to the time of observation. The "false positive" category of subjects shall be selected from people whose occupations require extensive handling of metal tools, for example, garage mechanics, machinists, and plumbers. Such subjects shall be expected to continue their normal handling of metal objects but they also should be asked to refrain from firing hand guns from the time they receive the treatment until after they have been inspected.

VI. TEST PROCEDURES

A log book will be kept showing the name of each subject employed, the category which he or she was assigned, the treatment prescribed for that subject, the date the treatment was received, and the date on which the subject was inspected. Each subject is to be assigned a subject classification (men, woman, "clean hands"; "false positives") and a treatment number from the subject-treatment matrix. The

subject's hands shall be exposed to the treatment designated, the subject shall then be free to continue his normal activities for the prescribed time interval, and he shall then return and be inspected by the Trace Metal Detection Technique.

The observations shall be conducted in a darkened room by all of the observers simultaneously; the observations shall be recorded on individual Observation Record Sheets such as the one shown in this plan. For the inspection process, the test solution shall be applied to the hands of all sixteen subjects in a lighted area and the hands allowed to dry. The subjects shall be arranged in a random order and one subject at a time shall enter the darkened room for inspection. All of the observers shall inspect the subject together with a single light and then go on to the next lamp; the order of employing the lamps shall be:

1. Long wave portable;
2. Long wave laboratory;
3. Short wave portable; and
4. Short wave laboratory

After each examination, the observers will separately and without consultation or discussion record their observations on individual data sheets and hand them to the subject for completion when he leaves the room; four observers will thus give each subject sixteen data sheets. The subjects will complete the data sheets and leave them with the laboratory personnel conducting the test for use in data analysis.

VII. ANALYSIS PLAN

The data is to be analyzed in order to answer the following kinds of questions:

1. What is the likelihood that the Trace Metal Detection Technique will give positive results, when, in fact, the results should be false, as well as giving a false result when it should be true?
2. How well can observers detect prior handling of weapons?
3. How well can observers detect the presence or absence of metal traces?
4. How well can observer's identify specific kinds of weapons?
5. How are pattern attributes and consequently an observer's capability to detect a pattern, affected by:
 - a. strength and wave-length of the ultraviolet light source;
 - b. the type of contact with the metal;
 - c. the number of days which elapsed between the examination and the prior contact with the metal; and
 - c. by the normal activities (egg., working, wearing gloves, etc.) which tend to mask the signatures of metal weapons.

VIII. REPORTS

The results of this investigation will be required to be presented, both orally and in text form, at the scheduled workshop seminar on Metal Detection Techniques in October. Graphical representation of results and photographs of individual cases are desired in addition to tables and narrative text. The reports will include the analyzed data underlying the conclusions. Results for individual combinations of test variables will be presented, and aggregations of data may be made also when appropriate.

SUBJECT - TREATMENT MATRIX

SUBJECTS		No Treatment	Fire 5 Rounds - 2 min.				Hold 10 Minutes							Pull revolver 3 min.		
			Auto- matic		Revolver .38	Rifle .22	Auto- matic		Revolver .38	Rifle .22	Crowbar	Iron pipe	Full gas can			
			.32	.25			.25	.32						Butt	Bar-	rel
1	Men Clean Hands	B														
2		L	R													
3				L	R											
4						B										
5							L	R								
6		R							L							
7										B						
8											L			R		
9		L										R				
11	Women Clean Hands	L	R										L		R	
12					R				L							
13		L					R									
14	"False Positives"	L	R													
15				L	R											
16		R							L							

SYMBOLS:

R - Right Hand

L - Left Hand

B - Both Hands

MINNESOTA BUREAU OF CRIMINAL APPREHENSION

OBSERVATION RECORD SHEET

TRACE METAL DETECTION TECHNIQUE - LABORATORY ASSESSMENT PROJECT

(Observer completes this portion)

Observer:

Ultraviolet Light (circle)

Date:

Type: Portable, Laboratory

Time:

Wavelength: Short, Long

	Right	Hand Left
--	-------	--------------

1. Do you see a metal trace? How intense is it?

(S-strong; M-medium; W-weak;
N-none; D-don't know)

2. Do you see a pattern? How clear is it?

(S-sharp; M-medium; V-vague;
N-no pattern; D-don't know)

- b. If yes, specify the type of weapon or object

(Subject completes this portion after being examined)

Subject name:

Treatment number:

Days elapsed between treatment and observation (0, 1, 2, 3, 4)

Object handled:

Treatment (F-fired, H-held only;
P-pulled; N-none)

Comments:

APPENDIX B

DEPARTMENT OF PUBLIC SAFETY
MINNESOTA BUREAU OF CRIMINAL APPREHENSION

OBSERVATION RECORD SHEET

TRACE METAL DETECTION TECHNIQUE - LABORATORY ASSESSMENT PROJECT

(Observer completes this portion)

Observer:

Ultraviolet Light (circle)

Date:

Type: Portable, Laboratory

Wavelength: Short, Long

Time:

	Hand	
	Right	Left
1. Do you see a metal trace? How intense is it? (S-strong; M-medium; W-weak; N-none; D-don't know)		
2. Do you see a pattern? How clear is it? (S-sharp; M-medium; V-vague; N-no pattern/ D-don't know)		
b. If yes, specify the type of weapon or object.		
(Subject completes this portion after being examined)		
Subject name:		
Treatment number:		
Days elapsed between treatment and observation (0, 1, 2, 3, 4)		
Object handled:		
Treatment (F-fired, H-held only; P-pulled; N-none)		

Comments:

APPENDIX C

TRACE METAL DETECTION SEMINAR

Monday, October 26, 1970

Mr. Donald H. Bauer
Philadelphia Police Department
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Franklin Square
Philadelphia, Pennsylvania 19106

Mr. Frank J. Flanagan
Chicago Police Department
1121 South State Street
Chicago, Illinois 60605

Mr. Robert B. Foote
Albuquerque Police Department
Albuquerque, New Mexico

Mr. Vernon Glover
Crime Laboratory
Oklahoma City Police Department
Oklahoma City, Oklahoma

Mr. Gonzalo Gonzales
Dallas Police Department
Identification Bureau
Main and Harwood
Dallas, Texas

Mr. Ralph G. Grampe
c/o Criminal Intelligence
Cincinnati Police Department
222 East Central Parkway
Cincinnati, Ohio 45214

Captain Fred McDaniel
Kansas City Police Department
1125 Locust
Kansas City, Missouri 64104

Mr. Kenneth R. McDonough
St. Louis Police Department
St. Louis, Missouri

Mr. Edward V. Michalak, Jr.
Camden Police Department
Detective Bureau
Polygraph Unit
City Hall
Camden, New Jersey 08101

Lieutenant Robert J. Miller
Metropolitan Police Department
Identification Branch
300 Indiana Avenue N.W.
Washington, D.C. 20001

Mr. Thomas M. Muller
Director, Crime Laboratory Division
Baltimore Police Department
Fayette and Fallsway
Baltimore, Maryland 21203

Mr. William Patterson
Jackson Police Department
Jackson, Mississippi

Mr. William E. Rathman
Hamilton County Crime Laboratory
3223 Eden Avenue
Cincinnati, Ohio 45219

Mr. Daniel W. Waguespack
New Orleans Police Department
Crime Laboratory
715 South Brood Street
New Orleans, Louisiana

Mr. Joseph M. Wallace
Identification Section
Pittsburgh Police Department
Public Safety Building
Pittsburgh, Pennsylvania 15219

Mr. John F. Williams
San Francisco Police Department
Crime Laboratory
San Francisco, California 94103

Mr. Barney G. Wright
Memphis Police Department
128 Adams Avenue
Memphis, Tennessee

Mr. Riley McDaniel
Corpus Christi Police Department
Corpus Christi, Texas

Raymond C. Brown, Deputy Chief
362 Marlow Drive
Oakland Police Department
Oakland, California 94605

Tuesday, October 27, 1970

Mr. Eugene Ausdemare
Omaha Police Department
505 South 15 Street
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Mr. Clinton Chafin
Atlanta Police Department
175 Decatur Street S.E.
Atlanta, Georgia 30303

Mr. James Ira Cottrill
Detective Sergeant
Crime Laboratory
120 West Gay Street
Columbus, Ohio 43221

Mr. Richard C. Fischer
Criminalist I
Crime Laboratory
120 West Gay Street
Columbus, Ohio 43215

Mr. William Foster
Metro Police Department
Nashville, Tennessee

Mr. Allan Gilmore
Sacramento County Crime Laboratory
4400 V Street
Sacramento, California 95817

Mr. George C. Hart, Jr.
OSI Detachment 1209
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New Haven Police Department
152 Court Street
Detective Division
New Haven, Connecticut

Mr. William M. Mulderrig
Sacramento Police Department
Robbery-Homicide
813 Sixth Street
Sacramento, California 95822

Mr. William F. Nichols
Metro Police Department
Nashville, Tennessee

Mr. Gerald J. Parrish
Flint City Police Department
Flint, Michigan

Mr. Robert E. Perrigo
Buffalo Police Laboratory
74 Franklin Street
Buffalo, New York 14202

Mr. Vincent E. Severs
Crime Laboratory
Charlotte Police Department
825 East Fourth Street
Charlotte, North Carolina

Mr. John M. Smith, Jr.
San Antonio Police Department
Burglary Section
214 West Nueva Street
San Antonio, Texas

Mr. W. E. Spiva
Atlanta Police Department
175 Decatur Street S.E.
Atlanta, Georgia 30303

Mr. Don Stottlemeyer
State Department of Justice
P.O. Box 1859
Sacramento, California 95814

Mr. William Tatum
Beaumont Police Department
925 Main
Beaumont, Texas

Mr. Tom Lewallen
Tulsa Police Department
600 Civic Center
Tulsa, Oklahoma 74103

Wednesday, October 28, 1970

Mr. Clinton Benson
Bureau of Identification
Minneapolis Police Department
Court House
Minneapolis, Minnesota 55415

Mr. Francis D. Borre
Sheriff's Office
Jacksonville, Florida

Mr. Donnie Burns
Major
Newport News Police Department
P.O. Box 91
Newport News, Virginia

Lieutenant Glen S. Cahoon
Crime Laboratory
Salt Lake City Police Department
Salt Lake City, Utah

Mr. Terence Connors
Syracuse Police Department
512 Darlington Road
Syracuse, New York

Mr. Leon W. Eisenhard
Allentown Police Department
Allentown, Pennsylvania

Mr. H. M. Erickson
Safety Division
Wyoming Highway Patrol
Cheyenne, Wyoming

Mr. Eugene B. Gunn
Captain of Police
Miami Police Department
1145 N.W. 11th Street
Miami, Florida

Mr. H. Rolf Hong,
Special Agent
OSI Detachment 1209
(HQ Command, USAF)
Fort Snelling, Minnesota

Mr. James A. Howell
Birmingham Police Department
Birmingham, Alabama

Mr. Robert E. Joyner
Deputy Chief of Police
Portsmouth Police Department
711 Crawford Street
Portsmouth, Virginia

Mr. John J. Killoran
Detective Sergeant
Worcester Police Department
5 Waldo Street
Worcester, Massachusetts

Mr. James G. Mitchell
Lieutenant, Bureau of Identification
Louisiana State Police
Baton Rouge, Louisiana 70821

Mr. Robert E. Nicoletti
Sergeant, Crime Laboratory
Denver Police Department
13th & Champa
Denver, Colorado 80202

Mr. Drake C. Powers
Identification Officer
Minneapolis Police Department
Room 7, Court House
Minneapolis, Minnesota 55415

Mr. Robert E. Rauschke
Chief, Criminalistics Unit
Spokane County Sheriff's Office
West 4321 Olympic
Spokane, Washington 99208

Mr. Donald Riddle
Mobile Police Department
Mobile, Alabama

Mr. Marvin E. Snyder
Tacoma Police Department
Tacoma, Washington 98402

Mr. R. S. Swenor
OSI Det. 1209
Fort Snelling, Minnesota

Mr. J. E. Weaver, Captain
Savannah Police Department
Savannah, Georgia

Mr. Jarry Ray Wilson
Des Moines Police Department
Des Moines, Iowa

Thursday, October 29, 1970

Lieutenant R. J. Barber
West Virginia State Police
Charleston, West Virginia 25305

Jimmy Barnhill, Chemist
P.O. Box 4
Shreveport, Louisiana 71101

Edward J. Beach, Identification Technician
1013 Summer Street
Chattanooga, Tennessee

Mr. Clyde E. Bevis, Major
Wichita Police Department
115 East Williams
Wichita, Kansas

Lieutenant Colonel Walter A. Burch
Greensboro Police Department
Greensboro, North Carolina

Captain Robert F. Butcher
Lincoln Police Department
Lincoln, Nebraska

Mr. Gilbert Chang
Honolulu Police Department
1455 South Beretania Street
Honolulu, Hawaii

Detective Sergeant J. D. Cook
Topeka Police Department
Topeka, Kansas 66601

Detective Sergeant William E. Floring
South Bend Police Department
701 West Sample Street
South Bend, Indiana

Mr. James A. Gag
St. Paul Police Department
Crime Laboratory
101 East 10th Street
St. Paul, Minnesota

Mr. R. J. Hobbs, Jr.
Norfolk Police Department
OIC Identification
3811 Traut Avenue
Norfolk, Virginia

Lieutenant Chester D. Howard
Idaho State Police
Box 34
Boise, Idaho

Ralph M. Keaton, Criminalist
P.O. Box 2828
Raleigh, North Carolina 27602

Mr. Victor Kovacic
Cleveland Police Department
Forensic Laboratory
2001 Payne Avenue
Cleveland, Ohio 44114

W. LaBathe
St. Paul Police Department
Crime Laboratory
101 East 10th Street
St. Paul, Minnesota

Mr. Ronald Luneau
Connecticut State Police Department
100 Washington Street
Hartford, Connecticut

Mr. Floyd E. McDonald
Laboratory Director
Houston Police Department
Houston, Texas

Mr. Paul R. McDonald, Captain
Arkansas State Police
P.O. Box 4005
Asher Station
Little Rock, Arkansas 72204

Detective Edward Mercer
Homicide Squad
Louisville Division, of Police
633 West Jefferson
Louisville, Kentucky 40202

Mr. J. Larry Oxford
Georgia Bureau of Investigation
P.O. Box 1456
Atlanta, Georgia 30301

Sergeant George O. Patch
Department of Public Safety
Vermont State Police
Montpelier, Vermont 05602

Mr. Ed Ratkey
Identification Officer
Kansas City Police Department
City Hall
Sixth and Ann Street
Kansas City, Kansas

Captain Leonard R. Wentz
North Dakota Highway Patrol
1513 15th Street North
Bismarck, North Dakota

Captain B. G. Bryant
Montgomery Police Department
Montgomery, Alabama

APPENDIX D

During the week of October 1970, the Minnesota Bureau of Criminal Apprehension, under a grant from the National Institute of Law Enforcement and Criminal Justice, conducted a series of workshop seminars to introduce the Trace Metal Detection Technique (TMDT). This brief questionnaire is being sent to the people who attended those sessions. Would you please spend a few minutes in filling out and returning this form to help us determine the value of the TMDT to law enforcement agencies, and the effectiveness of the workshop seminar approach for introducing new law enforcement technology to responsible officials throughout the country. An immediate reply would be appreciated. A self-addressed stamped envelope is enclosed.

Date:

Results of Survey Form #1

Department Name and Address:

For person answering:

Name:

Personnel category (check one): 48 Sworn officer. 11 Civilian.

Rank or grade:

Section or Division to which assigned:

Title:

Main functions:

Since learning the Trace Metal Detection Technique, have you practiced it just to become more expert in it?

- 32 Yes, more than ten times.
- 18 Yes, less than ten times.
- 9 Not at all.

Optional comments:

Since learning the Trace Metal Detection Technique, have you used it in actual criminal investigations of any sort?

- 7 Yes, more than ten times.
- 16 Yes, less than ten times.
- 36 Not at all.

Optional comments:

Has a short-wave ultraviolet lamp been available to you? (check appropriate answer)

- 41 The Department had a short-wave UV lamp before Oct. 26.
- 8 The Department obtained a short-wave UV lamp since Oct. 26.

- 7 A short-wave UV lamp has been ordered but not received.
3 A short-wave UV lamp is not available and has not been ordered.
2 Other (please explain)
Planned on ordering in future.

Have you demonstrated the capabilities of the Trace Metal Detection Technique to anyone else in your department?

- 57 Yes, to approximately 1723 people.
2 No.

Have you taught the Trace Metal Detection Technique to anyone else in your department?

- 41 Yes, to approximately 287 people.
18 No.

Have you taken any photographs of TMDT patterns under ultraviolet light?

- 6 Yes. 53 No.

Have you been building a picture dictionary of TMDT patterns?

- 5 Yes. 54 No.

If not, would you be willing to participate in an effort of this nature?

- 42 Yes. 17 No.

At this time, what is your opinion of the Trace Metal Detection Technique?

Favorable - 48
Limited Value - 8
No opinion - 3

At this time, what is your opinion of the workshop/seminar method of introducing new law enforcement technology?

Favorable - 58
No response - 1

Any other comments?

Return to: Laboratory
Minnesota Bureau of Criminal Apprehension
1246 University Avenue
St. Paul, Minnesota 55104

APPENDIX E

During the week of October 26, 1970, the Minnesota Bureau of Criminal Apprehension, under a grant from the National Institute of Law Enforcement and Criminal Justice, conducted a series of workshop seminars to introduce the Trace Metal Detection Technique (TMDT). A preliminary questionnaire was sent out in January, 1971 to those who attended. A summary of the results of this survey is enclosed. An additional questionnaire is being sent out at this time in order that up-to-date information concerning the utilization of the TMDT can be obtained. Would you please spend a few minutes in filling out this form. An immediate reply would be appreciated.

Date:

Results of Survey Form #2

Department Name:

Name of Person Answering:

Title or Position:

1. Since learning the Trace Metal Detection Technique, have you practiced it to become more expert in it?

<u>23</u>	Yes, more than 10 times.	Approximate number of times.	<u>1400</u>
<u>10</u>	Yes, less than 10 times.	Approximate number of times.	<u>40</u>
<u>3</u>	Not at all.		

2. Do you have a short wave ultraviolet lamp available?

<u>36</u>	Yes.
<u>0</u>	No.

3. Have you demonstrated or taught the Trace Metal Detection Technique to others since the first questionnaire was submitted?

<u>31</u>	Yes, to approximately <u>824</u> people.
<u>5</u>	No.

4. Have you taken any photographs of TMDT patterns under ultraviolet light?

<u>10</u>	Yes. Approximate number <u>181</u> .
<u>26</u>	No.

Reason for not taking pictures.

Lack of photographic capability:	<u>6</u>
Lack of time:	<u>14</u>
Other:	<u>3</u>

5. Since learning the Trace Metal Detection Technique, have you used it in actual criminal investigations:

		Number of Cases		
<u>27</u> Yes.	Type of Case	Total	Results of Value	Results of No Value
<u>8</u> No.	Homicide:	60	28	32
	Suicide:	287	120	167
	Aggravated Assault:	29	18	11
	Burglary:	11	1	10
	Other:	34	14	20
	TOTAL	421	181	240

Comments: _____

6. Has the TMDT been used by your department in any legal proceeding?

3 Yes. Results: one conviction - one case pending Superior Court
32 No.

How do your prosecuting authorities feel about the use of TMDT results in court proceedings?

1 Strongly favorable.
8 Favorable.
3 Unfavorable.
0 Strongly unfavorable.

7. At this time, what is your opinion of the Trace Metal Detection Technique?

7 Strongly favorable. 2 Unfavorable.
20 Favorable. 1 Strongly unfavorable.
4 Indifferent.

8. Any other comments?

Return to: Laboratory
Minnesota Bureau of Criminal Apprehension
1246 University Avenue
St. Paul, Minnesota 55104