The International Association For Identification

Utah Division of I.A.I.

Chartered 1989

NEWSLETTER

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Presidents Message
by
George Throckmorton
1997 President

I must say there are some exciting things on the agenda for I.A.I. in the future for Utah. The Spring Training meeting at the Davis County Complex was beneficial for all participants and attendees.

For the first time in Utah Division of I.A.I. history we saw the presentation of the "James H. Gaskill Award of Excellence and Achievement." This award was given to Scott R. Spjut from the State of Utah Crime Laboratory for his work in the Michael Decorso homicide investigation.

James Gaskill from Weber State University was also given a special plaque in commemoration of this new award. I would like to quote the exact words on the special award given to Mr. Gaskill:

"The Utah Division of the International Association for Identification most gratefully recognizes 'James H. Gaskill' for his ongoing contributions in the field of Criminalistics in the State of Utah. For more than 25 years, 'Jim' has contributed his time and expertise in teaching thousands of students, and working on thousands of criminal cases. In recognition of his life long efforts, the Officers, Directors, and Members of the Utah Division of the International Association of Identification would like to honor him by making an annual presentation of the "James H. Gaskill" Award of Excellence and Achievement to that individual who most exhibits a high degree of quality and professionalism in the field of Forensic Identification within the State of Utah. The name of this annual Award shall stand as a legacy of Jim's pioneer status and long standing dedication to professionalism and excellence in the field of Forensic Identification in the State of Utah."

In order to perpetuate this award and honor those Utah IAI members within the field of forensics who exhibit professionalism, there was a committee appointed to set future guidelines for presenting this award. Don Thurgood (Vice-President), Debbie Herrera-Parkin (Secretary), and Jeff Itami (Member of the Board) will evaluate future guidelines and present their findings for membership consideration. This will allow Utah IAI members from all over Utah (not just the Wasatch front) the opportunity to receive this award in the future.

Thank you to all the members and potential members of the Division who attended the Spring Training Meeting. Along with a business meeting we had presentations by Jeff Itami, Scott Spjut, and myself within various aspects of investigations. Scott presented his work in the Decorso case, Jeff presented information about the future of IAFIS, and I presented the Mark Hoffman bombing/forgery investigation. I believe that all who attended were well rewarded for being there.

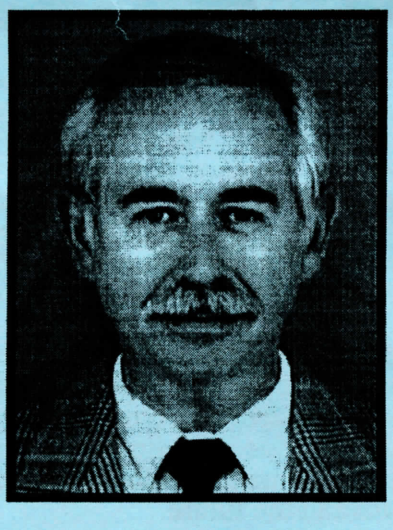
We would also like to thank the Davis County Sheriff and his Department for allowing us to meet at the Sheriff's Office and especially for Deputy Bob Hunt who was always there to assist with our needs.

Our Fall meeting is in the planning stages, but we are looking for a spot toward the middle or southern part of the State of Utah. Fillmore, Beaver City, Cedar City, or any other areas would be appropriate. If anyone would like to host a meeting please give me a call (799-3030) by July 15th, otherwise I may be calling some of you to see if you will help.

I have had contact with many of you in the past few months and I am continually impressed with the professional attitude each of you have exhibited. The Utah Division of the I.A.I. has some of the best identification professionals anywhere in the nation.

If any of you have been following some of the high profile cases around the nation you will know the forensic identification profession is being attacked in the courts and news media for lack of professionalism. Even the FBI has experienced some embarrassing situations regarding their laboratory. If we prepare ourselves through proper training and high standards of excellence we should be able to avoid these potential problems.

"Pretrial embarrassment is much better than courtroom humiliation!"



George J. Throckmorton
1997 President Utah Division of I.A.I.

The Utah Division of The International Association for Identification (I.A.I.) has been a chartered division of The International Association for Identification since 1989.

The Utah Division of I.A.I. Newsletter is published four times a year during the Spring, Summer, Fall, and Winter. The information contained within the newsletter is either in the form of submitted articles, information from other investigative publications, or reported information.

The Utah Division of I.A.I. Newsletter will accept any article or information of those wishing to submit to the editor. It is requested the submitted articles or information be in typewritten form or on 3.5" disks using WordPerfect 6.0 or lower.

Please send items to be published to the editor:

Scott R. Spjut
Editor, Utah I.A.I.
State Crime Lab
4501 So. 2700 W. BOX 148285
Salt Lake City, UT 84114-8285

The Utah Division of I.A.I. Newsletter reserves the right to reject or modify any submitted articles deemed to be slanderous, derogatory, or inappropriate for the members of the association.

The annual membership dues to the Utah Division of I.A.I. are currently $15.00 per membership, or $200.00 for a lifetime membership. Dues can be mailed to:

Utah Division of I.A.I.
Ms. Deborah Herrera-Parkin
Salt Lake County Sheriff's Office
Identification Section
437 South 200 East
Salt Lake City, UT 84111

It should be noted Deborah will be sending out renewal notices for members who have not yet paid their 1997 dues.

Utah Division if I.A.I.
Insignia Items

The Utah Division of I.A.I. has baseball hats, t-shirts and lapel pins with the Division Insignia embossed on them. These items are available for a minimal charge and look great! The prices for these items are as follow:

Hats	**$5.00**
T-Shirts	**$8.00 (any size)**
Lapel Pins	**$3.00 Members**
	$5.00 Non-members

Contact 1997 President, George Throckmorton at (801) 799-3030 or Editor, Scott R. Spjut at (801) 965-4501 for further information or to purchase these items. Likewise, we have these items available at the Division Semi-Annual Meetings.

Call For Papers!

Your 1997 Division Historian Arthur Terkelson requests a Call for Historical Stories from the members of the Division. These can be anything which would be beneficial or shed some historical light of the crime investigation field. These stories or articles will be printed in future editions of the newsletter, so please send your historical items in!

Meet Michelle E. Heward The Utah Division of I.A.I. Legal Representative

In the last Newsletter most of the new elected or appointed Officers were introduced to the rest of the Division, except for our Legal Representative. So here's your chance to get to know Michelle.

Michelle E. Heward graduated from Weber State College in 1982 with a B.A. in Psychology and a History Minor. She attended the University of Utah Law School and received her Juris Doctorate in 1987. Michelle worked in a law firm since high school and through her undergraduate and post graduate schooling. She continued to be employed with that firm for an additional four and 1/2 years after receiving her J.D. where she worked private practice.

Michelle left private practice and was hired as a Deputy Weber County Attorney in 1992, and worked as a prosecutor for three and 1/2 years. She is now working full-time as a teaching Professor at Weber State University where she teaches law classes for the Criminal Justice Department. Michelle had taught as an Adjunct Professor for approximately five years prior to her full-time position. Two years ago when L.G. Bingham retired Michelle was hired to her full-time teaching status.

Michelle is married to Gary Heward who is also involved in the Criminal Justice field as a Deputy Weber County Attorney. Michelle and Gary are the parents of three wonderful boys.

Newsletter Articles

The following article was submitted by Darren Jewkes, the current Secretary of the Utah Division of IAI. Darren presented this article at the FBI Administrative Advanced Latent Fingerprint School in Quantico, Virginia March 1997. Darren is currently employed as a Criminalist at the State of Utah Crime Laboratory.

LASER TECHNOLOGY AS UTILIZED IN THE DEVELOPMENT OF LATENT PRINTS

INTRODUCTION

The application of laser for the detection of latent fingerprints began to be explored in the mid 1970's and has grown in acceptance in the forensic application to latent fingerprint work and in most all areas in the forensic field.

In order to utilize and fully appreciate laser amplification of light for the detection and visualization of latent prints, one should first understand the basic properties of light, light waves, the electromagnetic spectrum and laser absorption for florescence. Also, without an understanding of inherent florescence, that latent sweat residue is generally too faint and often times overwhelmed by the background florescence from the surface on which it is located, the greater the possibility of missing that print. Special treatments have been devised to enhance a fingerprint's ability to florescence. Dusting with florescent fingerprint powders and dye-staining with florescent dyes like rhodamine-6G after cyanoacrylate fuming for instance, are now routine procedures in laser equipped law enforcement agencies.

This report will provide an explanation of the way fingerprints are detected using laser enhanced florescence, of the use of filters to reduce background florescence and of some of the various light sources currently being used.

LIGHT AND THE ELECTROMAGNETIC SPECTRUM

Light is defined as sub-atomic particles of energy called photons which travel outward in waves just like sound or vibrational waves travel through the atmosphere. The concept of light waves demonstrates light as having an up-and-down motion while traveling in a continuous direction. Waves are distinguished by measurements called wavelength and frequency. A wavelength is the distance between two consecutive crests and is given the Greek symbol (λ) Lambda and is expressed in nanometers. Frequency is the number cycles a wave completes passing any one point for a unit of time, is designated by the letter "f", and is expressed in cycles per second (cps). The speed of light is a universal constant at 300,000,000 meters per second and is designated by the letter "c". Wavelength and frequency are inversely proportional to one another as shown by the relationship expressed in the equation:

$$f = c/\lambda \quad \text{or} \quad \lambda = c/f.$$

Visible light is only a small part of the large group of radiation waves known as the *electromagnetic spectrum.* All varieties of electromagnetic radiation travel at the speed of light and are distinguishable from one another only by their different wavelengths and frequencies. On one end of the electromagnetic spectrum are Gamma rays, which are followed by X-rays; followed by Ultraviolet rays; followed by Visible light; followed by Infra-red rays; followed by Microwave rays; followed by Radio rays. Gamma rays on one end of the electromagnetic spectrum have the largest frequency and the shortest wavelength while the opposite is true for Radio waves on the other end of the electromagnetic spectrum. White visible light is not one color but a range of wavelengths which is characterized by it's color. These wavelength bands of color are arranged in order from red, orange, yellow, green, blue, indigo to violet. The spectrum of visible light can be separated into color bands by the use of a prism. The mechanism which enables us to see in color is a phenomenon of absorption/reflection. When we see a red object for instance, visible light is reflected off the surface and all colors except red are absorbed into the object. The red color is reflected and we see it as the color red.

Normal light waves are classified as incoherent light because it is a mixture of multiple wavelengths traveling in all different directions independent of each other. Laser technology allows the ability to amplify light of a specific frequency. This amplified light is called coherent light or LASER light which stands for Light Amplification by the Simulated Emission of Radiation. Light in this form is very intense and can be focused on a very small area. Laser light is so intense it can even cut small holes through solid objects

FLUORESCENCE

To understand the phenomenon of fluorescence one must first consider what is taking place on a sub-atomic level during fluorescence. Electrons in molecules reside in orbitals of lowest possible energy. In other words electrons will reside in energy orbitals where they are most comfortable, which is sometimes referred to as the *ground-state.* When light energy of a specific wavelength is absorbed by a molecule, an electron is promoted to a higher energy orbital resulting in a higher energy state or an *excited-state.* Due to entropic forces a molecule in an excited state will quickly return to its ground-state

and release a photon of light-energy which has a longer wavelength than the original light source. This luminescence of light-energy is termed fluorescence.

Typically, light of a shorter wavelength is used to initiate fluorescence, usually in the ultraviolet region. The emitted light is of a longer wavelength which may result in emission of fluorescent light through the visible spectrum (yellow through red) or low infra-red region.

Most of the illuminating light is not absorbed rather it is scattered or reflected off the surface being examined. And it is possible that the surface of the item, for example the coloring on an aluminum soda-pop can, may give off unwanted "background" fluorescence. Filter barriers are used which filter-out the lower wavelengths allowing the longer wavelength light that is truly fluorescing from the latent print to pass through.

There are numerous substances which have inherent luminescent qualites and several fluoresce when exposed to laser or alternate light. Common household products such as liquid detergents, petroleum product and certain components of paints will inherently fluoresce as well as biological substances such as urine and semen. Riboflavin and pyridoxin found in sweat on latent print residue will also fluoresce at 565nm and 400nm respectively. However, these components are found in such limited quantities in latent fingerprint deposits that they do not show sufficient fluorescence following excitation by laser light.

To improve upon inherent absorption based fluorescence, fingerprint treatments were devised to either increase the fingerprint fluorescence intensity or to give it a color different from that of the background so that optical filtering can be used. Supplemental dusting with fluorescent fingerprint powders or staining with fluorescent dye-stains can increase detection sensitivity by a factor of 100,000.

LIGHT SOURCES

1. Large-frame Argon-ion lasers:
The earliest detection method used exclusively argon-ion lasers. This laser type was chosen because its blue-green output matched the ultraviolet absorption of components of fingerprint residue. This is a high powered laser which was required because prior to the advent of fluorescent powders and dye-stains, the laser had to be powerful enough to fluoresce the trace component in fingerprint residue and be seen by the naked eye.

2. Portable Argon-ion lasers:
Portable argon-ion lasers became available in the mid 1980's. These lasers are low-powered and could operate on ordinary household current. They were designed primarily for detection of trace elements at crime scenes. The detection sensitivity is a factor of 25-100 times lower than that of the large-frame machines.

3. Neodymium YAG lasers:
In the early 1980's, portable frequency-doubled Nd:YAG lasers started to see use in the law enforcement agencies. The operating wavelength is 532 nanometers. In terms of detection sensitivity, these lasers are comparable to the portable argon-ion lasers.

4. Copper-vapor lasers:
These lasers are pulsed, operating at about 5000Hz and operates at 510 and 570 nanometers. 578nm is on the high-end for fingerprint fluorescence but it can be used in special situations. Copper-vapor lasers are not mobile.

5. Forensic light sources:
Forensic light sources are sometimes called alternative light sources. They are basically high intensity arc lamps equipped with band pass filters. The most common of these are the Omniprint 1000 and the

Luma-lite. Both types have filters with transmission at about 490nm. These types of light sources mimic the argon-lasers output. These light sources have several selections of filtered wavelengths so a wider range of fluorescence can be visualized than large-frame argon-ion lasers. They are also quite popular due to its lower price and ease of portability.

PHOTOGRAPHY

Most any camera equipped with a lens (50mm is satisfactory) capable of close-up photography or a one-to-one adapter is adequate. High contrast film is recommended. At f/16 for small depth of field on curved objects, and an automatic setting are satisfactory. Usual shutter exposure times will vary from 1 to 16 seconds will produce good photographs. A filter is needed. Usually an orange filter will block out background fluorescence of 540nm or lower. It is recommended that red and yellow filters be used also if you are not getting good results with the orange filter. Results will vary depending on the types of surfaces so trial and error will usually help you locate a medium of highest fluorescence for photography.

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The following article was submitted by Jeff Itami, Regional Representative for the International Association for Identification. Jeff is currently employed by the Salt lake County Sheriff's Office within the Identification Section.

GSR Evidence Valuable
by
Deputy Jeff Itami

In the past several years we have had an appreciable increase in the number of shooting incidents within Salt Lake County, and as a result there have been more opportunities to utilize Gunshot Residue Kits (GSR Kits). There is also a great deal of confusion amongst both command and field personnel as to exactly what is needed to process a shooter's hands for evidence of shooting a firearm. Many times we are asked if we can "hot paraffin" test the hands of a shooting suspect. That is a technique that hasn't been in use since the late fifties! We've come a long way since then.

As valuable evidence indicating who may have fired a weapon is often lost because of the lack of knowledge, I felt I may be able to help the reader better preserve important gunshot evidence. All law enforcement officers should know what to do in order to preserve this important evidence.

Some officers may remember the Atomic Activation Neutron Test Kits, but the State Crime Laboratory uses a different type of test kit. They use a Scanning Electron Microscope to analyze individual elements of GSR. The idea behind the use of this kit is explained in the FBI manual on Gunshot Residue: "During the discharge of a gun, gases escape from the cylinder gap, or the ejection port, and blow back toward the shooter." According to the FBI Journal Volume 2, Number 1, 1986, antimony, barium, and lead are constituent elements in cartridge primers that form characteristic oxide particles during combustion, and are trace residues which can indicate that a firearm has been discharged.

Depending upon the use, the hands retain residues for about three hours. Residues that go up the nostrils of the shooter's nose are retained for eight hours, unless the weapon is being pointed at the shooter. The GSR Kits currently in use are not designed to obtain samples from nostrils, but they function just fine on hands or clothing. Specifically, the kits are designed for the areas of the hand around the thumb, the webbing between the thumb and index finger and across the back of the hand. Therefore those are the parts of the hands that you should not touch when dealing with a possible shooter. If you have to take a suspected shooter into immediate custody and handcuff him/her, you need to have clean, dry paper bags or sacks placed over their hands prior to handcuffing them. Placing these bags or sacks over their hands won't prevent you from securing the prisoner's hands. It will help to prevent the loss of valuable transitory and very fragile evidence from being lost forever. At the very worst an officer can request the Crime Laboratory to analyze the interior of the paper bags or sacks. Do not use plastic bags as this causes the prisoner to sweat and possibly "wash" off the GSR particles.

I realize that when field officers are effecting the capture of a potential shooting suspect they may not be thinking about the GSR test kit and the procedures for protecting easily lost but positive evidence. Certainly the most important concern is proactive officer safety. However, protecting possible evidence is also very important. Because this is very fragile evidence which can easily be lost, some care is needed to insure its usefulness. Once you realize that you don't let the suspect rub his/her hands together, put his/her hands in their pockets, or put on gloves. As soon as feasible, place plain, clean paper bags or sack on their hands. Also, please procure these bags ahead of time to allow you to have them available.

The procedures for collecting GSR from a potential shooting suspect are simple. After filling out the information on the pre-printed kit exterior the officer should either wash his hands or wear latex gloves so as not to contaminate the evidence source. The GSR kit is quite simple and consists of four small metal stubs coated with an adhesive carbon base. This base is protected by a lift off teflon cover which needs to be removed prior to collecting the evidence. The four stubs are labeled A, B, C, D. A & B are for the right hand and C & D for the left. Starting with the suspect shooter's right hand, take stub A and remove the protective teflon covering to expose the adhesive surface. Gently yet firmly "swab" the right hand thumb and webbing area then place the stub back into the kit. Do the same with stub B except this time "swab" the upper back of the hand. Repeat these procedures on the left hand using stubs C & D, with C for the thumb/webbing area and D for the upper back of the left hand. After all the stubs have been used and returned to the plastic container box, seal the box with evidence tape and place the box into the provided envelope. Make sure the exterior envelope is likewise sealed and all the pertinent information is written envelope. The GSR Kit is now ready to be submitted to the State Crime Laboratory.

The GSR Kit has been used to make many cases and aid in shooting investigations. The evidence is important from both an investigation standpoint and a prosecution standpoint. Your help in preserving such gunshot evidence prior to the incarceration of the suspect is vital to our continuous mission to investigate crime.

Editor's Note:
The Gunshot Residue Kits processed at the State of Utah Crime Laboratory need to be of a specific type. They must be a pre-coated adhesive carbon based aluminum stub. Some of the older kits submitted to the Crime Laboratory are not compatible with the Scanning Electron Microscope currently in use. If the collecting stub is not Carbon based we are unable to process it. This is particularly frustrating if the stubs are the focal point of your investigation.

Although departments can purchase GSR Kits from a variety of suppliers, the State Crime Laboratory recommends purchasing the kits from ***Tri-Tech Inc. 1-800-438-7884.*** *The kits are specifically manufactured and labeled for the State of Utah Crime Laboratory. If ordering GSR Kits the item number is* ***GSR-SEM-(UT).***

"Well, first you say you *saw* the defendant at the scene and now you say you *think* you saw him! ... Let's cut to the chase, Ms. Sunbeam—is it possible your entire testimony is nothing more than a mere fairy tale?"