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President's Message:

Dear Friends,

With the trees slowly starting to change colors and the evenings getting cooler, I realize that summer has come to an end and fall is upon us. I hope that you all enjoyed your summer and made the best of it while it was here. I was kept busy with new work commitments, and with the exception of a few short weeks that seemed to fly by, spent the majority of my time at the office. Oh well, maybe next year.

Around this time last year, we published a survey developed by the Proficiency Testing Committee. The IABPA Board, as well as, the Proficiency Testing Committee was interested to know how you felt about testing and or assessments. The survey has been completed and the results are in. Unfortunately, we only had 70 respondents, which is slightly less than 10 % of our total membership. The results are published in this issue of the NEWS.

It's now September and the IABPA annual training conference is fast approaching. I would like to take this opportunity to recognize the Conference Committee (Charlene Marie) for her hard work and taking on the task of organizing this year's event. Remember, this is ***your*** conference so let's make it one to remember.

While on the topic of the Conference I'd like to remind you of the business meeting. I'm still looking for agenda items. If you have a topic for discussion or wish to bring anything forward please send Norm or myself a quick e-mail and we'll get it on the agenda for the meeting. We currently have a few things on the go so your attendance at the business meeting is essential. I will be calling again for agenda items at the commencement of our business meeting and then accepting a motion for the business agenda. With limited space and time in which to proceed only those items on the agenda will be addressed. So, please send us an e-mail.

See you in Sunny California!

Take care of yourselves and be good to one another.

William (Bill) Basso

Bloodstain Pattern Analysis and IABPA Region VI *"A Discipline in Development"*

Mark Reynolds

Introduction

Bloodstain Pattern Analysis (BPA) is recognized by many law enforcement jurisdictions as a stand-alone scientific discipline within the general field of forensic science. Qualified practitioners are often called upon to provide interpretive "crime event reconstructions" based on bloodstains and bloodstain patterns in their respective judicial systems. The significance of BPA within the scene examination process, and its ability to add value to major crime forensic investigation, has been recognized for a number of decades by the law enforcement machinery of mainland USA and Canada.

Whilst many would say that the watershed case for BPA was that of Dr Sam Sheppard, it is of interest to note that Australia too has had its own BPA "Fugitive" case in Alexander McLeod-Lindsay. On 15 September 1964, McLeod-Lindsay came home to find his 4-year-old son and wife severely injured, his wife having been struck about the head repeatedly with a large metal jackhammer pick. McLeod-Lindsay became the prime suspect for the attempted murders and was convicted of the offences in March 1965. The conviction was based in part, on evidence by a scientific squad detective with no formal BPA training who gave evidence that the spattered stains on the clothing of McLeod-Lindsay could be "*nothing other*" than impact spatter.

Doggedly protesting his innocence during his incarceration, and with the advent of new knowledge and techniques, and several international BPA experts (Wonder and MacDonell) weighing in, McLeod-Lindsay won his bid for further examination of the case with the matter being referred for judicial inquiry before the NSW Supreme Court in March 1991. A NSW forensic biologist and accomplished BPA practitioner, Tony Raymond, demonstrated that; "*a majority of stains on some of the items of clothing could have been produced by expiration spatter"*. At the original trial, McLeod-Lindsay had stated that his wife had coughed/wheezed several times when he moved her. Whilst not all the bloodstaining observed and commented upon in this case could be innocently explained, McLeod-Lindsay was pardoned in August 1991.

Bloodstain Pattern Analysis in Western Australia

The Australian BPA picture, and in particular that of Western Australia, is one of infancy. In Western Australia pre-2000, the use of BPA had been irregular and superficial, a second or third hat worn by experienced forensic investigators with a keen interest, yet little specific training or related qualifications. Today, BPA is the most frequent 'crime event reconstruction' technique utilized by the WA Police Service's (WAPS) Crime Scene Unit (CSU) during the forensic investigation of major crime.

Subsequently, the increased recognition of BPA by all levels of WA's judicial system for its considerable value within the investigative matrix has stimulated the need to implement structured application, peer review and reporting processes for the discipline. As of January 2005, WAPS has three qualified BPA specialists and three specialist trainees. The completion of BPA duties is still secondary to the core functions of these six officers. Two of the qualified specialists occupy senior management positions within the Forensic Division with associated restrictive time constraints placed on their ability to carry out regular BPA duties. As a result, they provide mainly peer review and mentor support, with the author and the three trainees responsible for the majority of BPA scene attendance and examination duties.

In October 2003, as the recipient of Australia's National Institute of Forensic Science Michael Duffy Travel Fellowship, the author travelled to the USA and Canada for a period of five weeks during which time he had the privilege to meet and observe some of the world's leading BPA practitioners. Following many discussions and personal observations it became apparent to the author that for best practice BPA development in Western Australia, a structured, discipline-specific program was required. In 2004, a two-tiered BPA Development Program was drafted and implemented within the WAPS Crime Scene Unit. Initial targeting of the program was to provide an increased familiarity with the principles of BPA and reinforce the first-step need for an educated "preliminary" BPA scene assessment.

BPA Awareness Training AIM

> *Provide a level of **BPA Awareness training** to all Forensic Investigation Officers likely to attend and assess scenes of major crime involving bloodshed. This training is designed to educate personnel to a level enabling them to recognize potential evidence within bloodstains and bloodstain patterns and record and collect BPA specific evidence, if required. This awareness training is not designed to allow the participant to undertake detailed interpretations of bloodstains and bloodstain patterns found at crime scenes but to recognize the need to involve a suitably qualified bloodstain pattern analyst, and assist that analyst, when required.*

The BPA awareness package is delivered over 16 hours of interactive lectures and includes the following components;

- Occupational Health and Safety (general crime scene and blood-borne pathogens)
- Basic bloodstain pattern recognition (general overview of pattern types)
- Bloodstain pattern photographic principles (including road mapping, digital image capture and 360º virtual reality [VR] or nodal photography)
- Evidence packaging and collection principles (BPA evidence specific)
- Basic principles of crime event reconstruction utilizing BPA
- Basic principles of sequential scene examination techniques (BPA with other disciplines)
- Case study presentations
- Training package assessment

An accurate assessment regarding the potential of BPA evidence at a scene is pivotal to the overall scene examination outcomes, particularly where a sequential examination involving a multi-discipline approach is required. As a result, all major crime forensic investigators attached to the Crime Scene Unit would receive the program's first training tier. To date, 22 of 28 CSU members have received this level of training. In line with CSU staff turnover and training reinforcement principles, the provision of BPA Awareness training is ongoing. The author is of the opinion that in part, the awareness of BPA potential is a volatile skill and as such, requires skills reinforcement over time.

The second tier of the BPA Development Program was aimed at the cultivation of a core group of qualified specialists available to undertake complicated BPA scene examinations and present findings within WA's judicial environment.

BPA Specialist Development AIM

> *Develop a number of **BPA Specialists** suitably qualified to examine scenes involving bloodshed and provide interpretative opinion evidence regarding the bloodstains and bloodstain patterns observed at those scenes, to criminal investigators for subsequent consideration and presentation within the judicial environment.*

The selection of trainees for the specialist development component of the program was initiated with a call for written 'expressions of interest' from CSI's attached to the WAPS Forensic Division. It was felt that the success or otherwise of this program tier would hinge on the appropriate selection of suitable individuals. Following the interest call, a panel of three including the author, OIC Forensic Division Training Unit (FDTU), and OIC CSU, assessed the written applications. Whilst CSI experience was a substantial consideration in the selection process, the ability to work unsupervised or alternatively, within a team environment, plus a demonstrated history of applying scientific methodologies and analytical thinking to fieldwork was considered essential. A determination was also made regarding the number of trainees required. Fundamental to this program tier was exposure to BPA related casework. The selection panel saw no value in selecting 10 trainees, when historically there were only 20-30 BPA related cases per year.

Subsequently three trainees were selected and in order to complete the ***BPA Specialist Development Program*** they will be required to successfully undertake the following training or examinations, where possible, as sequenced:

- Attend a 40-hour Basic Bloodstain Pattern Analysis Course (approved IABPA content)
- Commence or progress through related tertiary level education (course progression rate determined by FDTU)
- Assist with the compilation and delivery of BPA Awareness Training
- Complete 18-month 'understudy' program including 3-phase progression of scene examination responsibility
- Complete research project (BPA related) suitable for international publication or presentation
- Successfully complete a 3-hour written examination (75% PM)
- Undertake an oral certification board, simulating trial presentation of evidence inclusive of generic scene examination methods, photographic and biological scene recording and collection techniques, case file documentation and preparation and presentation of final court report
- A further component, desirable but not essential, of the development program is the attendance and successful completion of an advanced course in bloodstain pattern analysis (as yet unavailable in the southern hemisphere)

These first three trainees are on schedule to complete the specialist development program in late 2005. The succession-planning component of this overall program tier will see the selection of a further small number of trainees to commence the specialist development process in early 2006.

Analyst accreditation is another important component to be considered upon completion of the specialist development program. To this end, the requisite documentation is to be compiled for consideration by the Australasian Forensic Field Sciences Accreditation Board (AFFSAB), which acts under the auspices of the Australian Police Professional Standards Council (APPSC). Whilst BPA discipline specific, the accreditation process will be generically similar to that undertaken by Australian fingerprint, firearm and document examiner specialists. Only a small amount of preliminary work towards achieving analyst accreditation has been completed at this stage.

It is also the intention to work towards having the specialist development tier recognized by a registered training organization. Initial inquiries with the forensic education faculty at the Canberra Institute of Technology in the Australian Capital Territory have indicated that there may be scope for the program to be modulized and mapped against dedicated learning outcomes comprising a Graduate Certificate level qualification. Further work required to achieve this recognition will be completed in the near future.

From his relatively limited exposure, the author believes that the BPA application model adopted by the Royal Canadian Mounted Police, whereby full time qualified analysts work on cases without distraction, is by far the best law enforcement program he has observed. The ability to concentrate on the task at hand, whilst being appropriately resourced with time and equipment, means that the quality of results is superior and well accepted by the associated judicial system. Whilst other jurisdictions with differing forensic service structures may find it difficult to see how it would be possible to implement a dedicated BPA response program, the full potential of the discipline will not be achieved until this occurs. It is this single, “discipline specific cap” that the author would like to see implemented within the WAPS Crime Scene Unit.

BPA in Australia

As in Western Australia, the history of BPA in Australia is relatively short with only a limited number of practitioners having recognized and utilized BPA in any meaningful way during the late 1980’s and the 1990’s. Whilst several Australian jurisdictions ran informal internal BPA training courses, the first structured 40-hour basic course was not run in Australia until about the mid 1990’s. One of the issues we see today, as with then, is that it appears that some jurisdictions view the delivery of this BPA training as a blanket approach. Australia-wide, BPA duties are second or third caps for scene attending CSI’s whether they be police or scientist. As a result, in order to cope with natural attrition and previously trained personnel going on to other duties, there is perception that by pumping people through a 40-hour basic course there will always be enough practitioners left to fill any voids. The danger in this approach is that there appears to be little attention paid to further or ongoing BPA training, related research and most importantly, exposure to BPA tasking volume for skills development and reinforcement.

Some jurisdictions have too many people trained for too few BPA tasks and personnel can find themselves required to attend a complicated BPA matter with skills that have been shelved for 12 months, or longer. Alternatively, a number of smaller jurisdictions have very few or no, people suitably trained and qualified to complete BPA tasks and/or the appropriate training, support or peer review processes.

What however, is the most frightening of the all the BPA application methods that has been observed, is the "40-hour expert" mentality of some of Australia's forensic service managers ("You've done the course.....now you're an expert"). In jurisdictions where practitioners may be required to provide expert testimony with regards to several scientific disciplines from a single scene attendance, this mentality has the potential to not only put the individual's forensic career and trial outcome in jeopardy, but also could quite possibly damage, or complicate, the judicial acceptance of the discipline. In Western Australia at least, the "jack of all trades, master of none" approach to the forensic investigation of major crime is no longer utilized. Forensic investigators of major crime, apart from possessing generic crime scene examination skills, wear a single discipline specific cap whether it be post blast, ballistic, fingerprint, arson, tool mark, foot/tyre impression identification or BPA.

In 1992, following a key recommendation of the Chamberlain Royal Commission, a national forensic science body was developed with overarching Australia-wide responsibility for;

- Sponsorship and support of research in forensic science
- Advice on and assistance with the development and co-ordination of forensic science services
- The gathering and exchange of forensic information
- Support, co-ordination and conduct of training programs in forensic science
- Administration and control of relevant quality assurance programs

Subsequently, the National Institute of Forensic Science [NIFS (www.nifs.com.au)], along with several other related organizations, such as the National Association of Testing Authorities (NATA) and Senior Managers of Australian and New Zealand Forensic Laboratories (SMANZFL) may prove to be the opportune vehicles for raising the overall awareness of BPA and the development and implementation of BPA specific best practice guidelines and standards across Australia. Whilst it is accepted that imposition of guidelines governing BPA practice at a micro level will not be possible due to jurisdictional variability and local command and control directives, at a macro level the controlling bodies mentioned above should be able to influence the implementation of some base-line BPA practitioner and examination standards and related support mechanisms, on an Australia-wide basis.

In order to progress this notion of national BPA discipline specific baseline principles, a written proposal was recently submitted to the NIFS Board of Control articulating the need for an IABPA Region VI Critical Areas workshop. The workshop proposal suggests attendance by two or three members from each policing jurisdiction; with an emphasis on senior BPA practitioners and facilitators of BPA related training. The attendance of representatives from NIFS, SMANZFL and applicable tertiary service providers, such as Canberra Institute of Technology, who deliver the national Bloodstain Evidence module, would also be requested. It is hoped that a forum such as this, with involvement of all interested key stakeholders will provide the impetuous for some national agreement and the development of clear discipline specific, albeit preliminary, direction.

Obviously, whilst no formal agenda items have been prepared at this time, it was submitted that the theme of the workshop should be the overall development of the BPA discipline, practitioner education, training and support standards and the promotion of IABPA Region VI to key stakeholders. Some suggested agenda points submitted in the proposal to NIFS are as follows;

- Development of BPA practitioner education, experience and training guidelines
- Accreditation and certification of BPA practitioner training and development programs
- Establishing BPA practitioner support network(s) and peer review processes including cross jurisdictional development
- Discussion on development of IABPA Region VI and involvement of smaller stakeholders, particularly Asian nations
- Promotion of IABPA membership within Region VI
- In addition to an IABPA Executive Vice President, development of an IABPA Region VI sub-committee
- Standardization of a national BPA basic 40-hours course (IABPA approved content)
- Development of an IABPA Region VI advanced BPA curriculum
- Establishment of a discipline specific scientific working group under NIFS umbrella
- Development of a meaningful BPA proficiency test (consideration of VR technology)

Whilst it is acknowledged that some of the agenda points are complicated in theory and may prove difficult to implement and achieve, support for the overall workshop proposal and agenda point concepts from unofficial canvassing across Australia and New Zealand has been high. At the time of this article's submission, NIFS have given 'in-principle' agreement with this proposal and the workshop is likely to be convened in early 2006. IABPA Region VI (ASIAN) stakeholder jurisdictions including those outside of Australia such as New Zealand, Thailand, Indonesia, Singapore and Hong Kong will be receiving workshop notification and invitations to participate in the near future.

BPA and IABPA Region VI

Hopefully, readers have recognized that the common theme throughout this article is that in IABPA Region VI, the discipline of bloodstain pattern analysis, from an overall perspective, is still in its formative stages of development. Whilst a core group of some very experienced and technically outstanding practitioners have been applying the discipline within their respective jurisdictions during the forensic investigation of major crime for more than a decade now, there has been a relative dearth of overall discipline co-ordination and development at a national level. Therefore, what currently exists in IABPA Region VI is opportunity. That is - opportunity to mould an evolving scientific discipline into one with structured and tested application processes accompanied by rigorous analyst accreditation, training, review and support mechanisms. It is hoped that the specific integration of this region of the world into the IABPA through the creation of Region VI will now give the region's BPA practitioners some ownership thus providing invigoration towards the further development of the discipline in both a localized and broad base sense.

In recent times, the author in collaboration with Dr Michael Taylor has developed some BPA research and peer support networks between WAPS and the Institute of Environmental Science and Research (ESR) New Zealand. In 2004, whilst in Perth, Dr Taylor supported the author during the forensic investigation of a BPA homicide and also provided some crime scene examination training to CSU personnel. In March 2005, at the invitation of Dr Taylor, one of the WAPS BPA trainees attended a BPA workshop run by ESR in Christchurch, New Zealand. The scope for this collaborative support between jurisdictions is endless and as previously mentioned, will be a focus of the IABPA Region VI "Critical Areas" workshop.

In furtherance of the promotion of the IABPA and Region VI the author has recently instituted an e-mail distribution list of interested persons and practitioners that has been used to provide information about BPA development, particularly those updates about the creation of IABPA Region 6. An active IABPA membership drive has also been undertaken with a significant increase in regional membership. The heartening aspect for BPA in Region VI is the numerous positive comments and offers of assistance the author receives. Once some national and regional discipline development initiatives can be agreed upon, there should be no shortage of people willing, and in position, to promote the discipline and its tremendous assistance to the forensic investigation of major crime.

In April 2006, the Australian and New Zealand Forensic Science Society (ANZFSS) is to host the 18th International Symposium of the Forensic Sciences in Perth, Western Australia. The focus of the symposium with be *"Forensic Science – Classroom to Courtroom"* and undoubtedly the forum will be used to highlight the talents of BPA practitioners in IABPA Region VI. Further information regarding this event can be found at www.anzfss2006.org.au.

About the Author

Mark Reynolds is a Sergeant and Senior Forensic Investigations Officer (Team Leader) attached to the Western Australia Police Service's Crime Scene Unit (CSU). The mandate of the CSU is the forensic investigation of major crime, primarily homicides, across the state of Western Australia. The author has 16 years of law enforcement service including completion of the WAPS Detective Training School, qualification and service as a Police Prosecutor and international policing deployment to East Timor attached to the UN War Crimes Investigation Unit.

Appointed as WAPS manager for the Bloodstain Pattern Analysis discipline in early 2004, the author is responsible for the co-ordination of scene attendance and examination of crime incidents where BPA is required and more recently, the formulation, implementation and subsequent maintenance of the formal WAPS BPA development program and its trainees. The author has also recently joined the National Association of Testing Authority's (NATA) Field and Identification Science's Proficiency Review Committee (PRC) as the subject matter expert for BPA with an associated Australia-wide responsibility to review all Collaborative Testing Systems (CTS) Proficiency Tests disseminated to Australian laboratories and practitioners providing BPA services.

Holding a Bachelor of Applied Science (Biology) Degree, a Graduate Diploma in Forensic Science and the Australian National Diploma in Forensic Investigation (Crime Scene), the author is currently studying towards a PhD in Bloodstain Pattern Analysis at the University of Western Australia's Centre for Forensic Science. For further information related to this article or BPA progression in Western Australia, Australia or IABPA Region VI, the author welcomes inquiries, or constructive advice at: mark.reynolds@police.wa.gov.au

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The author would like to thank the WAPS and the University of Western Australia's Centre for Forensic Science for their continued support in my personal and professional development through the collaborative student scholarship arrangements and to my PhD technical supervisor Dr Tony Raymond (current Director of NIFS) for his rigor in keeping my lateral movements to a minimum. Lastly, I would like to thank Pat Laturnus from the Ontario Police College for his guidance and advice regarding the formulation and implementation of the WAPS BPA Development Program.

Disclaimer: The comments contained in this article regarding the progression of Bloodstain Pattern Analysis within Australia and IABPA Region VI are the personal views and 'vision' of the author only, and in no way represent the agreed view(s) or strategy(s) of any agency, group or other individual.

RESEARCH ARTICLE

The Relationship between Errors in Ellipse Fitting and the Increasing Degree of Error in Angle of Impact Calculations

Alexei Pace B.E.& A.(Hons.), A.&C.E.

Introduction

The calculation of angles of impact of bloodstains is one useful mathematical tool in the forensic discipline of bloodstain pattern analysis. Such angles are obtained after measurement of bloodstain widths and lengths, through the use of standard formulae as described elsewhere in the literature [1,2,5]. Use of these formulae and the mathematical reasoning behind them is taught in all basic courses on this subject [3].

Areas of origin are used mainly to deduce whether the victim was allegedly standing, sitting or lying down when the blood spatter was created, i.e. to establish a vertical measurement to an area of convergence of a bloodstain pattern.

It needs to be mentioned that the bloodstain pattern analyst will rarely, if ever, require the angle of impact of a particular bloodstain calculated to a sub-degree accuracy. An error in the calculation of a few degrees either way is, in many cases, harmless and will not render the analysis useless. However, severity of the error will also depend of course on the distance from the blood droplet origin to the impact site.

Nevertheless, it is worth investigating where errors may be introduced in this technique, not only to ensure identification and quantification of potential or known error rates – which in this day and age of the Daubert challenge is something affecting all areas of scientific endeavour – but also to instil a sense of "discipline" in the analyst.

Students are taught how to best estimate the length of a bloodstain by 'completing' the ellipse to measure the length. Experience will render better ellipse fitting, as will the use of an ellipse template. Measuring the width of the stain is more straight forward as the edges are better defined.

A previous paper on this subject dwelt with some error aspects mathematically and derived equations for the estimation of the variances in the estimated distance of fall and the estimated angle of impact for blood droplets [4].

However, it is interesting to investigate a more "hands-on" approach by considering the error in angle of impact calculation which is rendered by a 1 millimetre error (either way) in the measurement of bloodstain lengths. This may be easily seen through Table 1. This table shows the error in the impact angle calculation when a 1mm measurement error in the bloodstain length is made, at four different angles of impact. The error in the angle of impact calculation is practically negligible up to impact angle of around 50°, thereafter it increases rapidly.

Width	15	**15mm**	15	15	**15mm**	15	15	**15mm**	15	15	**15mm**	15
Length	34	**35mm**	36	24	**25mm**	26	19	**20mm**	21	15	**16mm**	17
Angle of impact	26.2°	**25.4°**	24.6°	38.7°	**36.9°**	35.2°	52.1°	**48.6°**	45.6°	90.°	**69.6°**	61.9°
Error	0.8°		0.8°	1.8°		1.7°	3.5°		3.0°	20.4°		7.7°

Table 1. Table showing the increase in impact angle calculation error by the same amount of measurement error over the range of impact angles 25° - 70°.

This behaviour is best shown in Figure 1. , a graph onto which are plotted the error in impact angle calculation against an increasing bloodstain impact angle. As is immediately apparent, as the angle of impact increases, even a small measurement error will make a large difference in subsequent calculations. Similar calculations made with other bloodstain width/length ratios will yield different degrees of error, however the general trend will be the same – the greater the impact angle of a bloodstain, the greater will be the result of a measurement error on our calculations.

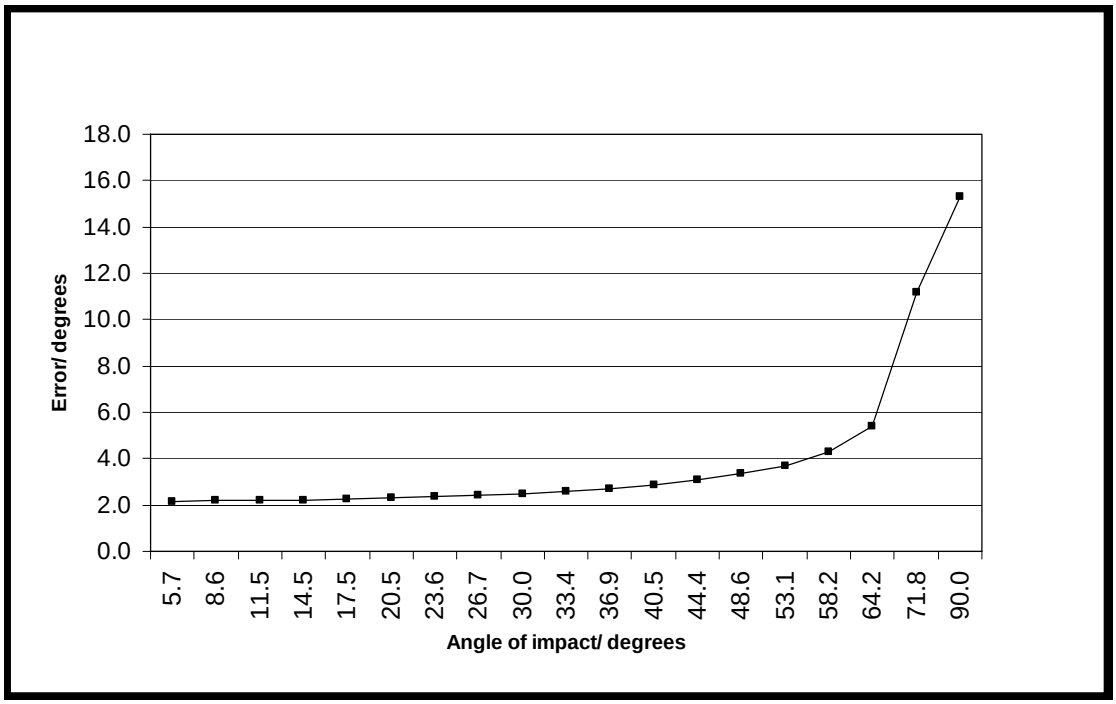

Figure 1. Graph showing how the error in calculating a bloodstain's angle of impact varies as a function of the bloodstain angle of impact itself.

In conclusion, some general guidelines can be drawn up:

- Always choose well-defined bloodstains for subsequent measuring.

- Try to choose elliptical, low-impact angle stains rather than those having a nearly-circular shape. As can be seen, it is best to place less weight on origin calculation results from stains having angles of impact greater than 50°.

- Always take the whole spatter pattern in context, rather than the individual stain by itself.

- Computer methods in BPA lend themselves very useful for quick analysis and presentation to a lay jury, however, they are still prone to the errors mentioned previously. Whilst such methods may give a heightened accuracy, the results are only as valid as the precision with which the bloodstains were measured.

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RESEARCH ARTICLE

Further Validation of the BackTrack™ Computer Program for Bloodstain Pattern Analysis – *Precision and Accuracy*

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Abstract

The BackTrack™ program for bloodstain pattern analysis is an excellent forensic tool that allows bloodstain pattern analysts to simply and quickly analyze patterns of projected bloodstains at bloodletting crime scenes. Although the program has been in use for a number of years, few validation studies have been carried out. In this work, 18 bloodstain targets were created, and then analyzed independently by a number of trained bloodstain pattern analysts (N = 8-11) using the BackTrack™ programs. The results indicate high precision, demonstrating that a number of investigators, analyzing the same scene, will arrive at approximately the same result with the program. The accuracy of the results is also very good, in keeping with previous validation studies.

Introduction

The BackTrack™ suite of computer programs uses Directional Analysis to provide bloodstain pattern analysts with a quick and accurate method of processing a bloodletting crime scene [1,2]. The stains left by blood droplets striking a wall are digitally photographed and then entered into the computer program along with data related to each droplet's Y- and Z-coordinates on the wall. Directional Analysis computes a virtual string for each stain that is a straight line attached to each stain extending outward in 3-D space with a direction that is equal to the direction of impact of the blood droplet. The top view of the virtual strings provides the analyst with a means of accurately determining the location of the blood source in two dimensions, in the plane of the floor. The side view of the strings then allows for an estimate of the upper limit of the third dimension, the height of the source. Only an upper limit is possible because the speed and size of the droplets are quantities unknown to the investigator. BackTrack™ offers the analyst the advantages of speed and ease of use.

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The top view of the virtual strings assumes that the flight paths of the blood droplets will be straight lines. Although gravity and air resistance will affect a droplet's flight, when viewed from above, these effects are not seen. The parabolic flight of a projectile remains in a plane perpendicular to the ground, and the BackTrack™ top view is looking down on the "edges" of these planes and seeing them as straight lines. The analogy would be to looking down on a ball being thrown between two children. Regardless of the height of the ball's flight, when observed from above, the ball simply travels in a straight line between the two children.

The side view, on the other hand, will be affected by the curvature of the flight paths. If a droplet has started to fall before it hits the wall, extending the path back as a straight line will take the path above the actual blood source location. Proper stain selection, choosing fast upwardly-moving droplets, will give the best estimate for the Z-coordinate, since the flight paths will most closely correspond to straight lines.

Despite the fact that BackTrack™ has been in use for a number of years, very few validation studies have been documented [3]. A previous publication took advantage of the fact that the software was being informally validated whenever the use of the computer program was taught [4]. In this case, over a hundred trials carried out over a number of years by students being taught how to use the program were collected and examined. The differences between the known values of the X-, Y-, and Z-coordinates of the blood source positions and those calculated by the students using BackTrack™ varied by up to 30 cm. However, the overall average difference (N = 122) in the worst dimension was less than 7 cm.

In the previous study, each target was analyzed only once by a single group of students [4]. When the computed values differed markedly from the known values, it was unclear if the discrepancy was due to the inexperience of the students, a poor choice of stains, a problem with the program, or if it was simply a difficult target to analyze. In the current study, a number of analysts were asked to process the same targets. In this way both precision and accuracy could be addressed. By calculating average values and standard deviations, it will be possible to comment on the repeatability of the process. A small standard deviation would indicate that different analysts examining the same pattern would come to the same conclusion with respect to the position of the blood source. A large standard deviation would require further explanation. The differences between the average values from a number of analyses will speak to the accuracy of the BackTrack™ programs. As in the previous study [4], the differences are expected to be small. A similar test is being carried out by members of SWGSTAIN [5].

Method

Six different laboratories were asked to create single-blow bloodstain pattern targets. A small pool of blood, approximately 10 mL, was placed on a flat surface at a known X-, Y-, and Z-position, and struck with a hammer. In each location, one individual created the pattern, and a second chose the stains for analysis. In this way, the choice of stains would not be influenced by prior knowledge of the location of the blood source. The chosen stains were measured in the Y- and Z-direction, a scale was affixed close to the stain, a plumb line was drawn, and the stain was digitally photographed. The images, measurement data, and the known source location data were sent to a central site from which the images and measurement data were sent to various locations for BackTrack™ analysis. In each location, BackTrack™/Images (Forensic Computing of Ottawa) and BackTrack™/Win (Forensic Computing of Ottawa) were used to analyze the images that were submitted. In laboratories where patterns were previously created, the analysts were requested not to process their

own patterns. A typical top view and side view used in the analysis of one of the targets is shown in Figures 1a and 1b. The top view can be used to determine the X- and Y-values corresponding to the location of the blood source. The side view is then used to determine the approximate height of the blood source. The values for X, Y, and Z were collected from the various laboratories, and averaged. The standard deviation was calculated using the conventional equation [6]:

$$S.D. = \sqrt{[\sum(X_i - X_{av})^2 / (N - 1)]} \qquad (I)$$

where N is the number of values being considered, X_i refers to the individual X-values from i = 1 to i = N, and X_{av} is the average value.

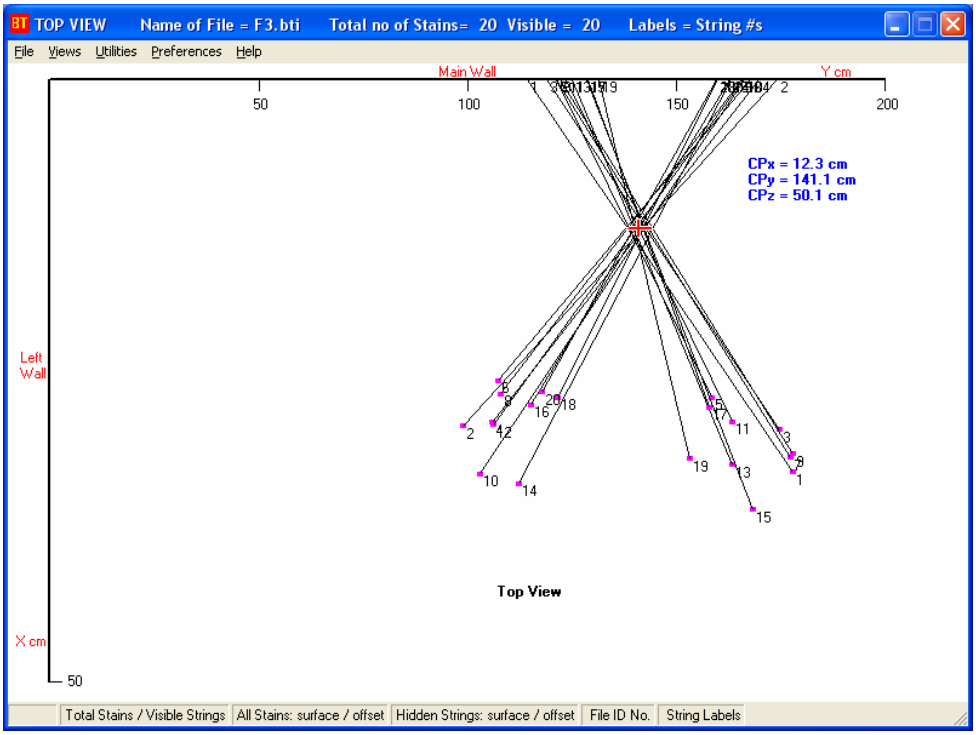

Figure 1a. Top view of Pattern #18. The average position for the line-crossings corresponds to the X- and Y-coordinates of the blood source location, in the plane of the floor.

Results

Table 1 lists the average X-, Y-, and Z-values for the blood source locations, along with the standard deviations. In all cases, the standard deviations were quite small, with the greatest values being 6.44 cm for the X-value in Target # 11, 3.38 cm for the Y-value in Target #13, and 7.02 cm for the Z-value in Target #2. Only four standard deviations were greater than 4 cm. Table 2 lists the known locations of the blood source for each of the targets, as well as the difference between the average calculated value and the known value. Although the difference was as great as 23.1 cm for the Z-value in Target # 16, the average differences between the known values and the average BackTrack™ values were only 2.5 cm in the X-direction, 2.3 cm in the Y-direction, and 8.1 cm in the Z-direction.

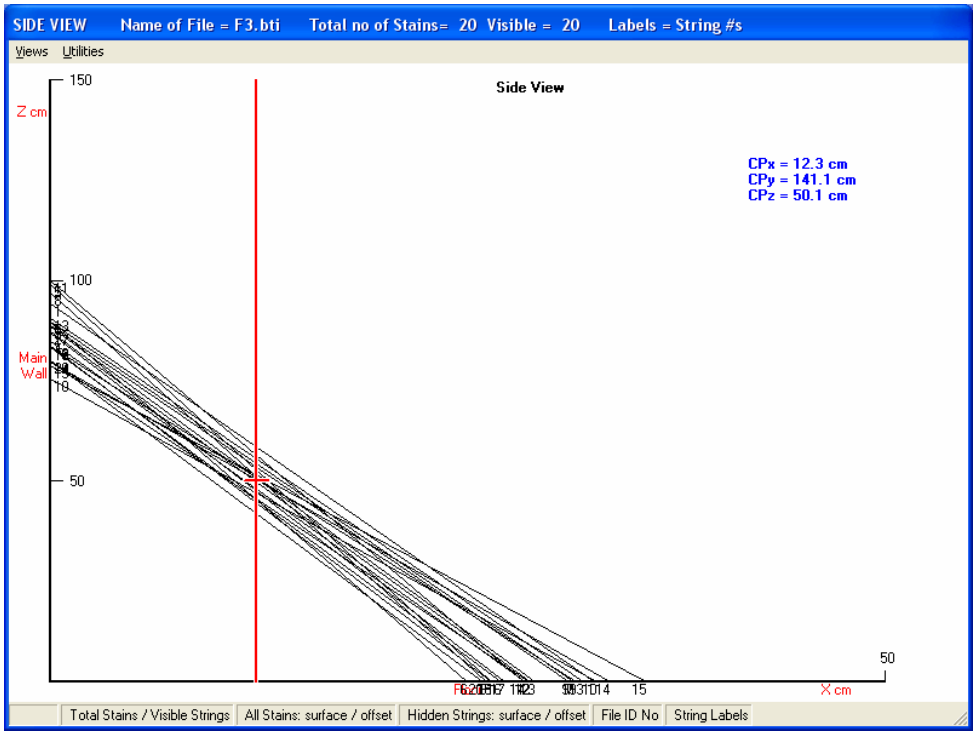

Figure 1b. Side view of Pattern #18. The vertical line corresponds to the X-coordinate calculated from the top view. The Z-values corresponding to where the strings cross the vertical line are averaged to determine Z, the height of the blood source.

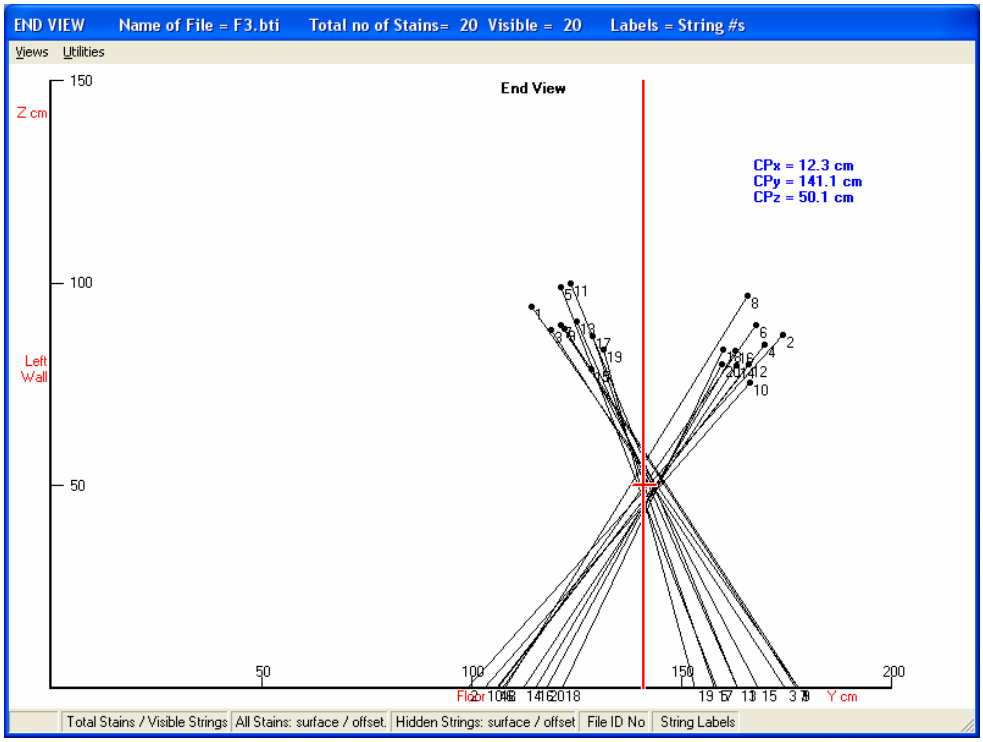

Figure 1c. End view of Pattern #18, facing the front wall on which the stains are located.

Target #	X/cm	S.D. (N =)	Y/cm	S.D. (N =)	Z/cm	S.D. (N =)
1	41.7	3.83 (10)	114.4	1.24 (10)	25.7	2.09 (10)
2	26.6	2.22 (11)	176.5	0.78 (11)	18.2	7.02 (11)
3	36.5	3.12 (11)	49.4	0.74 (11)	91.8	4.01 (11)
4	20.9	1.89 (10)	78.3	0.86 (10)	31.5	0.90 (10)
5	46.8	3.41 (10)	81.1	0.88 (10)	49.7	2.31 (10)
6	34.5	2.66 (10)	85.5	0.66 (10)	59.4	1.72 (10)
7	20.2	1.43 (11)	54.5	1.64 (11)	115.1	3.31 (11)
8	24.9	1.56 (9)	80.9	1.06 (9)	115.6	2.10 (9)
9	27.7	1.38 (9)	79.1	1.76 (9)	123.6	1.49 (9)
10	23.6	2.31 (10)	431.8	1.76 (10)	82.5	2.97 (10)
11	40.3	6.44 (10)	540.7	2.21 (10)	118.2	5.42 (10)
12	16.1	0.96 (11)	26.6	0.46 (11)	121.1	2.54 (11)
13	29.6	1.37 (9)	271.9	3.38 (9)	114.6	0.88 (9)
14	30.0	0.97 (8)	138.0	1.88 (8)	93.5	0.95 (8)
15	25.7	1.65 (11)	244.6	1.33 (11)	100.0	1.76 (11)
16	57.1	3.53 (10)	126.5	2.32 (10)	127.4	2.71 (10)
17	33.4	2.09 (11)	102.9	2.25 (11)	107.3	1.47 (11)
18	13.2	1.26 (11)	141.3	1.58 (11)	49.6	1.71 (11)

Table 1. Average X-, Y-, and Z-values calculated using BackTrack™ for the blood source locations, along with standard deviations (N = 8-11) calculated using equation I.

X/cm	X_{av}/cm	ΔX/cm	Y/cm	Y_{av}/cm	ΔY/cm	Z/cm	Z_{av}/cm	ΔZ/cm
46.0	41.7	4.3	115.0	114.4	0.6	12.0	25.7	13.7
30.0	26.6	3.4	176.0	176.5	0.5	2.5	18.2	15.7
38.0	36.5	1.5	50.0	49.4	0.6	81.3	91.8	10.5
21.0	20.9	0.1	80.0	78.3	1.7	32.0	31.5	0.5
48.0	46.8	1.2	83.0	81.1	1.9	41.0	49.7	8.7
36.0	34.5	1.5	89.0	85.5	3.5	52.0	59.4	7.4
24.0	20.2	3.8	52.5	54.5	2.0	114.0	115.1	1.1
28.0	24.9	3.1	82.5	80.9	1.6	114.0	115.6	1.6
31.0	27.7	3.3	80.0	79.1	0.9	121.0	123.6	2.6
27.0	23.6	3.4	439.0	431.8	7.2	75.0	82.5	7.5
40.0	40.3	0.3	543.0	540.7	2.3	105.0	118.2	13.2
20.0	16.1	3.9	23.0	26.6	3.6	105.0	121.1	16.1
26.0	29.6	3.6	275.0	271.9	3.1	116.0	114.6	1.4
25.0	30.0	5.0	145.0	138.0	7.0	93.0	93.5	0.5
25.0	25.7	0.7	245.0	244.6	0.4	95.0	100.0	5.0
61.1	57.1	4.0	129.5	126.5	3.0	104.5	127.4	22.9
34.4	33.4	1.0	102.0	102.9	0.9	90.7	107.3	16.6
13.5	13.2	0.3	142.0	141.3	0.7	48.8	49.6	0.8

Table 2. Known values compared to the average calculated X-, Y-, and Z-values for the blood source locations. The average differences in each direction (N=18) are: $\Delta X = 2.5$ cm ; $\Delta Y = 2.3$ cm ; $\Delta Z = 8.1$ cm.

Discussion

The standard deviations for the X-, Y-, and Z-values for all 18 patterns were very small, ranging from 0.46 to 7.02 cm, with the majority (44/54) being less than 3 cm. These small values indicate that a number of experienced analysts examining the same crime scene would come up with approximately the same BackTrack™ results. A small standard deviation could be interpreted as illustrating that the precision of the method is quite good.

The accuracy of the results can be addressed by examining the values in Table 2. For the most part, in agreement with previous studies [3,4], the accuracy of the BackTrack™ programs is very good. As might be expected, for each target the largest discrepancy between the average value calculated and the known location was usually in the Z-direction. According to Directional Analysis, the X- and Y-values for the blood source location will be estimated very well. Any curvature of the flight paths of the blood droplets will not affect the analysis. Indeed, even blood droplets travelling in a downward motion can still be used in BackTrack™ calculations for the X- and Y-coordinates [7]. The Z-value, however, is estimated from the side view of the virtual flight paths. If a droplet is slow-moving, it will be starting to fall before it hits the wall. Tracing the flight path back as a straight line will show the droplet originating from a point directly above the actual blood source location. As a result, the Z-coordinate is often overestimated. The precision of the results, as shown in Table 1, implies that the cohort of analysts collaborating here would all calculate a similar overestimation of the Z-value as seen, for example, in Targets #2 and #3.

Targets #2 and #3 come in for special consideration due to the fact that the known value of Z is quite small. As a result, some of the strings seen in the side view may hit the floor before reaching the appropriate X-value away from the wall, and will, thus, not contribute to the calculation of Z. If these strings could be drawn through the floor and added to the average as negative values, they might have pulled the value of Z down closer to the true value. On the other hand, a clever modification of the data, though not used here, would have been to add a constant correction factor to every Z-value to raise the entire pattern up from the floor. This would not have affected the calculation of the X and Y positions, but would have ensured that all strings were considered in the Z calculation. Once Z had been determined, the correction factor would have been subtracted from the result to get a true Z-value. This type of manipulation, which could be brought into play whenever the blood source seems to be close to the ground, would not be possible with other analysis techniques. Similarly, for Patterns #10 and #11, a correction factor could be subtracted from the Y-values in order to bring the pattern closer to the origin for easier analysis. Once a Y-value was calculated, the correction factor would be added to get the true value.

In order to expedite the analyses, stains from each target were chosen and photographed in the laboratory in which the targets were created, rather than having each analyst choose and photograph his or her own stains. If each analyst had been given the entire pattern to examine, the stains chosen might have been different, and might have resulted in different final values. The SWGSTAIN experiments involve sending the entire pattern to each participant, so that the entire process, from stain selection to final calculation, will be done by one person [5]. However, having every analyst use the same stains produces standard deviations that relate to only the software itself, without the added variable of varying stain selection.

Conclusion

This validation study shows that a number of analysts examining the same bloodstain pattern with the BackTrack™ suite of programs will generally come up with very similar results. As well, the results generated will be quite accurate, in agreement with previous studies.

Acknowledgements

We thank Rick Ouellette for imaging assistance.

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Results of the IABPA Bloodstain Pattern Proficiency Testing Survey

1. Do you currently participate in any method of continuing assessment of your bloodstain pattern analysis casework?

   Yes 48 Respondents
   No 22 Respondents

   If no, would you be interested in participating in some type of continuing assessment?
   Yes 17 Respondents indicated a desire to have some sort of testing
   No 5 Respondents

   Internal proficiency tests 7 Respondents - annually
   External proficiency tests 22 Respondents - annually
   Technical peer review 44 Respondents [10% to 100% of the time]

   IF YES, what type of assessment would you suggest and who should be responsible for its administration?

2. What method of assessment is most suitable for you? [more than one choice]

   Standardized proficiency test 38 Respondents
   Technical peer review 46 Respondents
   Other, please describe 4 Respondents
   Preferred Provider 18 Respondents - private test provider
   45 Respondents - IABPA as test provider
   8 Respondents - suggested other

3. What is your profession? [more than one choice indicated]

   Law Enforcement 34 Respondents
   Forensic Laboratory:
   Government 27 Respondents
   Private 2 Respondents.
   Consultant 11 Respondents

4. How many years of experience do you have performing bloodstain pattern analysis casework?

   1-2 years 12 Respondents
   3-5 years 11 Respondents
   5-10 years 16 Respondents
   more than 10 years 28 Respondents

5. What concerns do you have with proficiency testing (please include any solutions you have that would alleviate your concerns)?

   - Lack of recognition of the importance of QA/QC by many in BPA; test design

- Courts provide assessment; lab proficiency testing does not fit crime scene cases (determining events and sequence)
- Tests need to be realistic and not convoluted; what level of proficiency is being tested (angle of impact, area of convergence, pattern interpretation); too many patterns & sequence may limit what an analyst would say without additional case info
- Different departments have different requirements; level of experience would dictate the level of testing
- Individual's agency should provide the assessment
- Access of records by the courts
- Individuals own agency should also be test provider
- Test preparer should be current in discipline; last test was clearly done by someone not familiar with bloodstain pattern analysis
- Tests are frequently too complicated, need to be simple and straightforward
- Assessment could be provided by Canadian Police Training Colleges
- Proficiency testing that is overly academic may hinder experienced crime scene techs that are competent but don't have advanced degrees
- Tests need to be set up by those educated and trained in BPA
- CTS test are subjective and quality was poor; test cost should be low
- CTS tests not realistic; much too involved with numerous patterns on same target
- CTS provided minimal evaluation of the results
- Test provided by certified analyst
- Viable testing for non-lab workers; low cost and easy proctoring; CTS won't work for law enforcement
- Test that allows for how far someone should go out on "that limb"
- Constructing an exam with definitive responses
- Photographs with no scenarios and crowded patterns on small photos (CTS tests)
- Terminology differences and language barriers
- SWGSTAIN as possible test provider; testing should be done by non-profit organization
- Testing can't deal with 3-dimensional aspect of BPA
- Tests must be independent assessed prior to distribution; are we testing competence or excellence?

- Acceptable & not acceptable answers must be established
- American Board of Criminalistics as possible provider; test preparer must be qualified and tests must cover all areas of BPA; should be coupled with certification program
- Colleagues with similar or greater experience can provide assessment; tests do not correlate to actual casework
- CTS is current external proficiency provider; CD with photos can be problematic
- IAI-BPA assessment is suitable
- How to deal with failure and provide feedback; test format
- Who will provide it?
- Limit testing to size, shape, and distribution of bloodstain geometry; no photography
- Legal profession; teaches and uses BPA in practice, no casework; testing may be too subjective and exclude smaller departments
- Proficiency. testing is valid in lab setting but BPA & crime scenes present too many variables that testing cannot accommodate
- Standardized terminology and method of measuring stains; test should focus on pattern recognition
- Testing qualifications, study materials and prior acceptable training standards
- Difference in instruction on various topics; terminology differences
- Reliability, validity and standardization in testing; test should be available to all, without a "gatekeeper" and there should not be "grand fathering"
- Own department should also provide assessment
- Currently assessed by courts; cost to implement, design and administer is cost prohibitive for IABPA; there are unique issue regarding what is considered in foreign courts; passing a basic proficiency doesn't mean you are proficient in complex cases
- Proficiency testing doesn't seem to be common or well known in BPA
- Standardization of terminology and reconstruction

2005 INTERNATIONAL ASSOCIATION OF BLOODSTAIN PATTERN ANALYSTS ANNUAL TRAINING CONFERENCE

SANTA BARBARA, CALIFORNIA
OCTOBER 5-6-7 2005
WEDNESDAY-THURSDAY-FRIDAY

Conference registration is $195

The hotel has changed its name from the Santa Barbara Radisson to the Hotel Mar Monte.
Room rates for IABPA at the Hotel Mar Monte are:
$114/night Sunday through Thursday nights &
$169 Friday & Saturday nights (plus taxes)

You can contact the hotel @ (800) 643-1994 or you can register online @ www.hotelmarmonte.com
reservations → group reservation → attendee code: IABPA
Make sure you let the hotel know you are with the* IABPA *and have a group rate.
Our rates are good from 9/28/05 through 10/11/05.

Travel options:
Santa Barbara is about 100 miles north of Los Angeles.

1. **You can fly into LAX and rent a car or take the Santa Barbara Airbus, (805) 964-7759 at www.sbairbus.com directly to the Hotel Mar Monte.**
2. **You can take a connecting flight into Santa Barbara Airport (SBA) from Los Angeles (LAX), San Francisco (SFO) or Denver (DEN) and then take the shuttle, (805) 683-9636 or www.superride.net, to the hotel.**

Questions? **Call or email Charlene at (805) 681-2580 Charlene.Marie@doj.ca.gov**

REGISTRATION FORM

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SANTA BARBARA, CALIFORNIA USA
OCTOBER 5-6-7 2005
WEDNESDAY-THURSDAY-FRIDAY

- LAST NAME_____ FIRST NAME_____
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- NAME FORMAT FOR ATTENDANCE CERTIFICATE_____
- AGENCY_____
- ADDRESS_____
- CITY_____ STATE_____
- ZIP CODE_____ COUNTRY_____
- TELEPHONE ( )_____ EMAIL _____@_____
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- SPOUSE/GUEST NAME _____
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California Department of Justice
Santa Barbara Laboratory
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INTERNATIONAL ASSOCIATION OF BLOODSTAIN PATTERN ANALYSTS
2005 Annual Training Conference – *Santa Barbara, California*

TENTATIVE PROGRAM

Tuesday – October 4th

1500 to 1900 Registration
Hospitality – Margarita Night

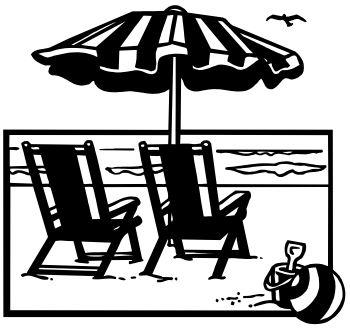
Wednesday – October 5th - Welcome

Sgt. Jeff Scozzafava	"Hidden" Bloodstain Evidence
Steve Kohne	Right Conclusion, Wrong Case !
Philippe Esperanca	3D BPA Modeling
Sharon Ballou	Who shot Whom?
Michael Barnes	Beating Patterns
John Aycock	A Bloody Mess in Texas
Geoff Ellis	RCMP BPA Understudy Program
Bruce Prange	A Double Homicide in Manitoba
Dean Marks	Cold Case

Narrated trolley tour of downtown Santa Barbara
Hospitality – "Sideways"

Thursday – October 6th

Iris Dalley	Terror in the Woods
Kim Duddy	Bloodstains That Didn't Seem to Fit
Pete Barnett	Bloody Fingerprint – Fresh Blood or Not?
Kevin Maloney	3D Imaging of Bloodstain Patterns
Debbie Harris	A Halloween Homicide
Silke Brodbeck	The Effect of Anticoagulant on BPA
Det. Vic Caloca and DAG David Druliner	The Stephanie Crowe Homicide
Gord Lefebvre	Digital Images of Luminol Photographs
Gillian Leak	How BPA Assisted in the ID of Other Crucial Evidence
Dr. David Baldwin	Overview of the Midwest Forensics Resource Center
Tony Onorato	SWGSTAIN Update



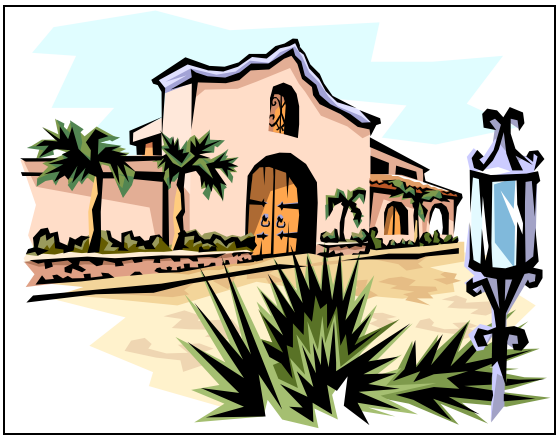
Banquet at the Santa Barbara Zoological Gardens
Joyce Dudley – A Prosecutor in Paradise

ay – October 7th

Tom Bevel	The David Camm Case
George Levine	A Reconstruction: Expiration or Spurt?
Michael Taylor	Bloodstains Where Feet Are Used as Weapons
Dr. Edward Bernstine	Bloodstain Patterns Related to Clothing
Martin Eversdijk	Applying Luminol Once is Good; Twice is Better
Martin Eversdijk	Collecting Blood from the Barrel of a Firearm

IABPA Business Meeting

Andre Hendrix	Region V Training/Conference
Sgt. Jeff Scozzafava	2006 Conference Proposal
Dr. Herbert MacDonell	2006 Conference Proposal



IABPA

2005
Annual Training Conference
Oct. 5th, 6th & 7th
Santa Barbara, California

Other Activities

Tuesday, October 4th - Visit the Wine Country
Tour the Santa Barbara Wine Country.
www.superride.net
Use IABPA as your code to reserve your seat.
This 5-hour tour, including lunch will cost $59 per person.
The van will pick you up and drop you off at the hotel.

Wednesday, October 5th - Take a Trolley Ride
At the conclusion of talks on Wednesday we
will board trolleys for a one-hour narrated tour
of the harbor and downtown Santa Barbara
included in your registration – bring your guest

Thursday, October 6th - IABPA Banquet at the Santa Barbara Zoo
Ride the zoo train & visit with a raptor
Listen to a strolling Mariachi band
Feast on Santa Maria style BBQ tri-tip and chicken

Enjoy listening to local author/ prosecutor Joyce Dudley
Dance under the stars

Saturday, October 8th - Kayak Tour
Kayak the sea caves of Santa Cruz Island, just off the Santa Barbara Coast
Reserve your spot using IABPA as your code
www.kayaksb.com
This trip costs $165 per person and includes pick up and drop off at the hotel, fast boat out to the islands, all your gear, and a guided tour of the sea caves
Bring your own lunch and dry clothes!
Paddle Sports of Santa Barbara will be at Wednesday's hospitality to take sign-ups and payment.

The First European IABPA Region V Training Conference Middelburg, Zeeland The Netherlands

To be held at the beautiful, medieval City Hall, Middelburg, Zeeland, The Netherlands.
15-17th February 2006

We invite Speakers to offer papers (research and case studies) and Delegates to register interest in this inaugural meeting.

For details please visit the web site:

www.european-conference-iabpa.nl

Speakers currently include:
Stuart James, Norman Reeves, Lee-Anne Singley, Martin Eversdijk, Mickle van der Scheer, Silke Brodbeck, Rob Spruit, Gillian Leak, Pete Smith, Chris Gannicliffe, Nigel Hodge and presentations from Tetra Scenes of Crime and Mason-Vactron Light sources.

Further Details contact: **Peter.Lamb@fss.pnn.police.uk**

Dear Colleagues,

It is with great pleasure that I would like to welcome you to the first European IABPA Region V Training Conference to be held in Middelburg, The Netherlands. All participants will be offered a varied program with speakers from various countries. The conference will also provide opportunity to make new acquaintances and update contacts with colleagues.

The underlying theme of the Conference is to exchange experiences and techniques of bloodstain pattern analysis and IABPA matters on a European level. At this moment it is not very clear who is involved with bloodstain pattern analysis on the European level and the standards that one acts upon. The Conference should provide more clarity on these matters.

The conference will be held in the historical, picturesque City Hall of the town of Middelburg that dates from 1452. The host and organizer of the Conference is the Zeeland Police force.

Participants will be expected to arrive in Middelburg, The Netherlands on the 14th of February, 2006 prior to the start of the proceedings on the 15th of February, 2006. A dinner will be offered on Thursday the 16th of February followed by an informal gathering during which participants will be able to extend or maintain your network. The conference is expected to be useful and educational and it is anticipated that it will give the science and techniques of bloodstain pattern analysis a more prominent and fundamental position.

With great pleasure I look forward to welcoming you on the 14th of February in Middelburg, Zeeland, The Netherlands.

Yours sincerely,

Andre Hendrix
Police Inspector and Deputy Chief
F.T.O. Police Zeeland, The Netherlands

E-mail: andre.hendrix@zeeland.politie.nl

All fields are mandatory

REGISTRATION FORM

2006 INTERNATIONAL ASSOCIATION OF BLOODSTAIN PATTERN ANALYSTS ANNUAL TRAINING CONFERENCE MIDDELBURG, ZEELAND, THE NETHERLANDS. FEBRUARY 15, 16, 17th 2006. WEDNESDAY- THURSDAY-FRIDAY

Last name:	
First name:	
IABPA Member:	
Name format for attendance certificate:	
Agency:	
Address:	
City:	
State:	
Zip code:	
Country:	
Telephone:	
Email:	
Spouse/Guest name:	
Will guest attend banquet: (50.00 euro additional)	

Conference Registration is: 175 euro if received by December 31, 2005 200 euro after that date 225 euro on site	**Make payable to: IABPA Europe Region V** 42.15.41.628 – Politie Zeeland – ABNAMRO20021 For foreign payment add: BIC/SWIFT-code: ABNANL2A IBAN-nr: NL42ABNA0421541628 IABPA Federal ID # 52-1597063
MAIL OR FAX COMPLETED FORM TO: Andre Hendrix Police Inspector & Deputy Chief F.T.O Police Zeeland Buitenruststraat 237 4337 ER Middelburg The Netherlands Fax: (0031) 118 433314 Tel: (0031) 118 433307 E-mail: andre.hendrix@zeeland.politie.nl	**MAIL PAYMENT TO:** andre.hendrix@zeeland.politie.nl **FOR CREDIT CARD PAYMENTS CONTACT:** Andre Hendrix Tel: (0031) - 118 433307 Fax: (0031) – 118 433314

BLOODSTAIN PATTERN ANALYSIS IN THE NEWS

Alexei Pace

www.bloodstain-forensics.com

Presented below are news articles that feature bloodstain pattern analysis. All links are active at the time of writing (mid-August 2005), however they may be put offline after a few weeks. These news items are distributed through the BPA in the News mailing list, which one may subscribe to by e-mailing me at ap@onvol.net.

A Valentine's Day Murder in Oklahoma
http://adelphia.net/news/read.php?id=2155954&ps=&cat=&cps=0

Interesting account of Dr. John Hamilton and his wife Susan, found murdered on Valentine's Day 2001. The defense hired Tom Bevel who had found evidence pointing towards the defendant's guilt and when asked about that he answered truthfully, effectively showing how, as he himself was reported saying afterwards *"Ultimately, you take an oath to tell the truth and that overrides any allegiance I may have to any client"*.

Crown wraps up case against Robertson
http://www.mykawartha.com/ka/news/kawartha_lakes/story/2837992p-3286831c.html

Testimony of Sgt. Mike Illes, in John Robertson's murder trial. Sgt. Illes showed the jury how trajectory lines can be drawn through the axis of a stain, converging at a point one foot in front of the workbench in the shop. He estimated the "blood source" from which the stains originated to be about six feet from that wall, and a maximum of about one foot from the floor in front of the workbench.

Evidence suggests 2 knives were used to kill 3 children
http://www.baltimoresun.com/news/local/bal-md.children03aug03,1,1894923.
story?coll=bal-local-headlines&ctrack=1&cset=true

During the trial of two men accused of murdering three children last year in Northwest Baltimore, a forensic scientist testified about apparent blood spatter on a light blue pair of jeans found in the bedroom of the Baltimore County home where the defendants lived. One pattern formed the shape of a knife with a 3 inch blade and a 4.5 inch handle, according to the scientist, Salvatore Bianca.

Wife testifies against Larson at murder trial
http://web.theparisnews.com/story.lasso?wcd=20685

Trial of Darrell James Larson, accused of repeatedly stabbing Roy Lee Williams, 57, and slashing his throat before leaving him for death in an alley. Tom Bevel testified in this case, who told the jury about a place on a wall where blood clearly was arterial blood, indicating that was the point at which Williams' throat was cut, severing the carotid artery. By the area where the blood hit the wall, between 30 and 36 inches high (around 1 meter high), Williams was probably on his knees at that point, Bevel testified.

ABSTRACTS OF RECENT BPA RELATED ARTICLES PUBLISHED IN THE SCIENTIFIC LITERATURE

Beaudoin,, A., Harrison, C. and Brown, C. Validation of the Hexagon OBTI Test for Use as a Confirmation Test for Luminol at Crime Scenes Attended by the Sûreté du Quebec, Identification Canada, 28(2), 4-11, 2005

Abstract:

The use of the presumptive test, luminol to detect possible bloodstains is often required at a crime scene. Because the test is presumptive, luminol may produce false positives. It is thus very important to determine if a stain is really blood, and if it is, to determine if it is human in origin prior to DNA typing. Recently, a promising new product, only recently available in Canada has been described in the literature. The Hexagon, OBTI test is a rapid immunochromatographic test for human blood. This new product, which reacts specifically with primate hemoglobin has been shown in many previous studies to be a very successful and valid forensic test for human blood. The test itself is very simple to use and can be carried out directly at the crime scene.

Hill, Lt. J. and Trummel, Sgt. M., Review of: Practical Crime Scene Processing and Investigation and Crime Scene Processing Laboratory Manual and Workbook, J. Forensic Sci., Vol. 50, No. 4, May 2005

Abstract:

This article contains favorable book reviews of *Practical Crime Scene Processing and Investigation* authored by Ross M. Gardner and *Crime Scene Processing Laboratory Manual and Workbook* authored by Donald Hayden. Both were published by CRC Press, Boca Raton, Florida in 2004.

Liesegang, J., Bloodstain Pattern Analysis – *Blood Source Location*, Canadian Society of Forensic Science Journal, 37(4), 215-222, 2004

Abstract:

Although procedures are available for estimating the position of the source of blood spatter patterns at crime scenes, it is often the case that the precision with which that position is specified lacks scientific definition. This paper focuses on the useful, well-known paper by Carter and Podworny which describes a procedure for calculating the horizontal planar position (taken as the X–Y plane) or plan position of the source as a point (X,Y), these being the plan co-ordinates of the vertical line of intersection of the vertical

trajectory planes associated with two droplet stains. Elementary calculus is applied to equivalent expressions to those of Carter and Podworny for X and Y, allowing in a well-defined way, the calculation of quotable uncertainties or errors in X and Y; i.e., the positive and negative values of which specify the precision limits of the calculated X and Y values. To illustrate the way in which these uncertainties may vary with distance and with angular position with respect to selected stains, a visualization of this precision is also presented.

Petricevic, S. and Elliot, D., Bloodstain Pattern Reconstruction – *A Hammer Attack*, Canadian Society of Forensic Science Journal, 38(1), 9-19, 2005

Abstract:

In a New Zealand homicide, the victim was hit at least six times in the back of the head with a hammer-like implement. Bloodstain pattern reconstruction was carried out to investigate the amount of blood that could have spattered onto an assailant during such an attack. A blood-soaked plastic model head was hit with a hammer six times and the resultant spatter recorded. Very little spatter transferred to the clothing of the assailant in this reconstruction. These findings indicate that clothing of assailants in such attacks may not be visibly bloodstained. Direct contact with the bloodied victim or with deposited blood may be required for the transfer of large amounts of blood to clothing.

Saviano, Jeffrey, Articulating a Concise Scientific Methodology for Bloodstain Pattern Analysis, Journal of Forensic Identification, Vol. 55, No. 4, 2005

Abstract:

The increasing number of courtroom challenges to various areas of forensic science has forced examiners to re-examine their methods of explaining analyses. Although the methodology involved in these disciplines is generally sound, many examiners have difficulty putting into words the steps involved in reaching their conclusions. This article addresses the discipline of bloodstain pattern analysis and attempts to describe an easy to understand methodology that can be articulated in the courtroom.

Smith, L.H., Mehdizadeh, N.Z. and Chandra, S., Deducing Drop Size and Impact Velocity from Circular Bloodstains, J. Forensic Sci. Vol. 50, No. 1, Jan. 2005

Abstract:

An experimental study was done to determine the diameter and velocity of blood drops falling on a surface by measuring the size of bloodstains they produced and counting the number of radial spines projecting from them. Bloodstains were formed by releasing drops of pig blood with a range of diameters (3.0-4.3 mm) and impact velocities (2.4-4.9m/s) onto four different flat surfaces (glass, steel, plastic, paper) with varying roughness (0.03-2.9 μm). High speed photography was used to record drop impact dynamics. Bloodstain diameters and the number of spines formed around the rim of the stains increased with impact velocity and drop diameter. Increasing surface roughness reduced stain diameter and promoted merging of spines, diminishing their number. Equations are presented that explicitly relate drop diameter and impact velocity to measurements of stain diameter and number of spines.

Organizational Notices

Moving Soon?

All changes of mailing address need to be supplied to our Secretary Norman Reeves. Each quarter Norman forwards completed address labels for those who are members. Do not send change of address information to the NEWS Editor. Simply E-mail your new address to Norman Reeves at:

norman@bloody1.com

Norman Reeves
I.A.B.P.A.
12139 E. Makohoh Trail
Tucson, Arizona 85749-8179
Fax: 520-760-5590

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Membership Applications / Request for Promotion

Applications for membership as well as for promotion are available on the IABPA website: IABPA Website: http://www.iabpa.org

The fees for application of membership and yearly dues are now $40.00 US

University of California (UC) Davis Extension Announces New Forensic Science Program for Fall 2005

DAVIS, California. — University of California (UC) Davis Extension is proud to announce a new open enrollment program in Forensic Science. Four new courses will be offered in fall 2005, and four additional courses are scheduled for winter 2006. The program is designed to help identification technicians, photographers and other crime scene responders build on their existing skills and learn new ones. All courses are offered in Davis, California and Post CPT credit for each course is currently pending.

CAD: Re-creating Crime Scenes Using Crime Zone Software is an introduction to the use of crime scene drawing software, specifically Crime Zone Software, for forensic crime sketching and drawing. Tuesday, **September 27-December 6**, 6-9 p.m.

Crime Scene Basics teaches the basic skills needed to process and evaluate crime scenes. Some of the course topics include principles of crime scene sketching, photography, note taking, proper evidence collection and preservation, bloodstain pattern analysis and report writing. Wednesday, **October 5-November 16**, 6-9 p.m.

Crime Scene Photography introduces the techniques used to photograph fingerprints, impressions, bloodstains and other evidence requiring close-up or copy photography. Saturday, **October 15, 22, November 5** and Sunday, **November 6**. Class times will vary.

Bloodstain Pattern Analysis covers the reconstruction of a bloodstained crime scene. Topics include safety, physical properties of blood and mathematics, documentation of crime scenes, experiments and more. Monday-Friday, **November 14-18**, 8 a.m.-5 p.m.

For more information or to enroll:

Call toll free (800) 752-0881, e-mail forensic@unexmail.ucdavis.edu or visit www.extension.ucdavis.edu/forensicscience.

Training Opportunities

October 3-7, 2005	**Midwestern Association of Forensic Scientists (MAFS) Annual Fall Meeting**

Adams Mark Hotel
St. Louis, Missouri

Contact: Bryan Hampton or Brian Krey
Tel: 636-949-7488
E-mail: BHampton@saintcharlescounty.org
www.mafs.org

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October 10-11, 2005
Multi-victim Death Scene Investigation and Introduction to Bloodstain Pattern Analysis

Tomball Police Department
Tomball (Houston), Texas

Instructor: Johnny Aycock
Contact: Bill Wagner
Tel: 301-855-2439
Online registration: www.forensictraining.us

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October 17-21, 2005
Violent Crime and Homicide Investigations

Goldthwaite Fire Department
Goldthwaite, Texas

Instructor: Johnny Aycock
Special Texas Ranger and additional instructors
Contact: Beth Stokes Criminal Justice Director
Central Texas Council of Governments
P.O. Box 729
Belton, Texas 76513
Tel: 254-933-7075 ex. 202
Fax: 254-939-0885
E-mail: bstokes@ctcogmpo.org

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October 17-23, 2005

Bloodstain Pattern Recognition Course

Northwest Bloodstain Pattern Association
Edmonton, Alberta, Canada

Course Coordinator: Sgt. John Forsythe RCMP
E-mail: jon.forsythe@rcmp-grc.gc.ca

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October 24-28, 2005
Crime Scene Reconstruction II

Norman, Oklahoma

Instructors: Tom Bevel and Ross Gardner
Contact: Elizabeth Bevel
Tel: 405-447-4469
Fax: 405447-4481
E-mail: tbevel1@cox.net

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October 25-28, 2005
Mathematics, Physics and Bloodstain Pattern Analysis

Edmonton, Alberta, Canada

Instructed by Dr. Fred Carter and
Dr. Brian Yamashita
Course Coordinator: Sgt. John Forsythe RCMP
E-mail: jon.forsythe@rcmp-grc.gc.ca

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December 5-9, 2005
Bloodstain Pattern Analysis Workshop

Miami, Florida

Toby L. Wolson, M.S.
Miami-Dade Police Department
Crime Laboratory Bureau
9105 NW 25th Street
Miami, FL 33172

Voice: 305-471-3041
Fax: 305-471-3350
E-mail: Twolson@mdpd.com

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Training Announcements for the December 2005 IABPA News must be received before November 15, 2005

Editor's Corner

This issue contains a new column for abstracts of recent BPA related articles in the scientific literature. My thanks to Brian Yamashita and associate editor L. Allyn DiMeo for researching the journals and their assistance with the compiling of the abstracts. I am always receptive to new ideas for the NEWS, so please contact me with your suggestions and comments.

The abstracts of papers presented at the 2005 IABPA Conference in Santa Barbara, California will be published in the December issue of the IABPA NEWS. I would also appreciate photographs of speakers and conference attendees for a photographic display in conjunction with the publication of the abstracts and the conference activities. Also, if you have completed BPA research projects or have been involved in interesting BPA cases, I encourage you to submit them to me for review by our associate editors for future publication in the NEWS.

Paul Kish and I had the privilege of instructing a basic course in BPA to the Metropolitan Police in London during July in the midst of the attempted bombing incidents that occurred. The course was organized by Tony Larkin in Islington near Kings Cross and it went well despite the "incidents" that took place during that time period and the preceding week. Paul and I both were impressed with the resolve of the citizens of London during this crisis and their ability to proceed with their lives and daily activities under the stressful conditions that existed.

You will note in this issue, the announcement of the First European IABPA Conference to be held February 15th-17th, 2006 in Middelburg, Zeeland, The Netherlands hosted by Politie Zeeland. Andre Hendrix and Peter Lamb have been working very hard to organize this Region V training conference and I encourage IABPA members to consider this opportunity to attend and interact with our European friends.

Mark Reynolds has announced in his article that appears in this issue that in April 2006, the Australian and New Zealand Forensic Science Society (ANZFSS) will host the 18th International Symposium of the Forensic Sciences in Perth, Western Australia. This is another great opportunity for members to attend and exchange thought processes and knowledge with our friends in our IABPA Region VI. The International Association of Bloodstain Pattern Analysts is now recognized as a truly international organization that benefits our forensic discipline.

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