

## JFI Abstracts from 2010-2013

### Individualizing Unidentified Skeletal Remains: A Differential Diagnosis Combining Pathological Changes and Biomolecular Testing

**Author(s):** Mundorff, A.Z.; Kiley, S.; Latham, K.E.; Haak, W.; Gilson, T.

**Type:** Case Report

**Published:** 2013, Volume 63, Issue 6, Pages 617-632

**Abstract:** Collaborative work among anthropologists, pathologists, and biomolecular analysts can maximize information included in a biological profile of skeletal remains. This case study demonstrates the benefits of a multidisciplinary approach to help diagnose disease processes from skeletal remains. In this case, skeletal pathologies on unidentified human remains appeared to be a result of both ankylosing spondylitis and spinal tuberculosis. This tentative diagnosis provided a starting point for biomolecular testing to help confirm these putative findings. The extraction of *Mycobacterium tuberculosis* DNA from bone samples indicated the disease's presence in this skeleton. Molecular screening for HLA-B27 to assess ankylosing spondylitis (AS) was, however, inconclusive. This case study demonstrates how macroscopic and biomolecular analyses can be useful in assisting in the identification of disease processes of an unknown individual in a forensic context.

### An Identification Based on Palmar Flexion Creases

**Author(s):** Hays, M.

**Type:** Case Report

**Published:** 2013, Volume 63, Issue 6, Pages 633-641

**Abstract:** Identifications based on palmar flexion creases are not very common. Known case examples and known examples presented in court are likewise rare. Because of their rarity, many examiners may not be aware of their existence or they may be reluctant to effect a similar identification themselves. This case study is an excellent example of how palmar flexion creases can be used to effect an identification, particularly when the exemplars are lacking in ridge detail.

### Recovering Dirt Fingerprints from Cadavers

**Author(s):** Ojena, S.M.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 6, Pages 642-651

**Abstract:** In a test situation, fingerprints that had a light coat of dirt were placed on the thigh, neck, wrist, and ankle of a cadaver. Electrostatic lifts from those areas resulted in the recovery of identifiable latent fingerprints. This paper discusses under what conditions it may be possible to lift latent electrostatic dust or dirt prints from the skin of deceased persons and the results of preliminary experiments. Fine, dry dirt was used in these experiments.

### Resting Gelatin Lifters Prior to Use

**Author(s):** McConaghey, D.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 6, Pages 653-659

**Abstract:** This paper discusses the importance of using proper lifting techniques when using gelatin lifters. Improper lifting techniques used at crime scenes can affect the physical size of an impression. Testing in the laboratory demonstrated how improper application techniques caused the footwear impression to have a smaller overall physical size.

## Identifying a False Positive Reaction from Bluestar on Nonporous Surfaces

**Author(s):** Sorum, E.D.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 6, Pages 660-673

**Abstract:** Bluestar has gained popularity over traditional luminol formulas for bloodstain enhancement since it first became available in 2000. Most literature about Bluestar states that the difference between a false positive and a true reaction is very distinct and impossible to confuse. The reaction times, color, and intensity are stated to be different and easy to visualize, with the trained technician being able to see the difference. However, this difference is almost never defined in the literature. This paper examines those specific differences in closer detail, defining the colors, times, and intensity levels observed, showing that they are not as easily visualized as previously suggested. The differences are extremely subtle and may not be as distinct and easily detected as the literature suggests.

## Sufficiency and Standards for Exclusion Decisions

**Author(s):** Ray, E.; Dechant, P.J.

**Type:** Article

**Published:** 2013, Volume 63, Issue 6, Pages 675-697

**Abstract:** Current research into latent fingerprint examiner decisions shows that erroneous exclusions are common and inevitable. These errors may be dramatically reduced by establishing clear standards for exclusion decisions and providing comprehensive training on exclusions to all latent print examiners. The first step in this process is to standardize verification for all exclusion decisions. Second, examiners must be able to use the inconclusive decision when it is appropriate. The inconclusive decision should be reached whenever there is insufficient detail in agreement to identify and when there is insufficient detail in disagreement to exclude. This decision gives the examiner an option that reduces the chance of erroneously excluding a print that was not located. The latent print unit at the Arizona Department of Public Safety has set its standard for exclusion to be Level 1 and Level 2 detail in disagreement. In other words, two or more target groups of minutiae near an anchor point such as a delta or core must be in disagreement for an exclusion. When these features are used in conjunction, examiners can be confident that they found sufficient disagreement to warrant an exclusion decision and reduce the chance of an erroneous exclusion. The latent print community should continue the discussion on a standard for exclusion to reduce the unacceptably high error rate on this decision and to clarify the appropriate use of the exclusion decision.

## Variability in Visualization of Latent Fingermarks Developed with 1,2-Indanedione--Zinc Chloride

**Author(s):** Fritz, P.; van Bronswijk, W.; Patton, E.; Lewis, S.W.

**Type:** Article

**Published:** 2013, Volume 63, Issue 6, Pages 698-713

**Abstract:** Amino acid variability in sweat may affect the ability of amino acid-sensitive fingermark reagents to successfully develop all latent fingermarks within a large population. There has been some speculation that age, gender, or prior activity may be the cause for differences in the amino acid profile within a population.

Latent fingermarks from 120 donors were collected and treated with 1,2-indanedione–zinc chloride. Grades were given to treated samples based upon their initial color and resultant luminescent properties. Degradation of developed prints over three years was also assessed by regrading all samples and comparing the results to the initial grade.

Statistical analyses, such as the Mann-Whitney U test, revealed that there was a correlation between the grade and the age of the developed print, age of the donor, and the washing of hands. However, no link was found between the food consumption or gender of the donor and the grade.

### **Re: Determining the Significance of Outsole Wear Characteristics During the Forensic Examination of Footwear Impression Evidence. J. For. Ident. 2013, 62 (3).**

**Author(s):** Bodziak, W.; Hammer, L.; Johnson, M.; Schenck, R.

**Type:** Letters

**Published:** 2013, Volume 63, Issue 5, Pages 493-502

### **The Effects of Ninyhydrin Processing on Common a-Amylase Tests**

**Author(s):** Bitner, S.; Clark, J.; Priestley, M.; Ziencik, B.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 5, Pages 503-513

**Abstract:** Casework management is becoming an essential part to improving laboratory efficiency and meeting the needs of police agencies and the courts. To better handle casework management, it is useful to know the impact of certain processing methods on tests performed in other disciplines in forensic science. In this study, three types of envelopes were processed for latent prints using ninhydrin and were later sampled and tested for the presence of salivary a-amylase. The ninhydrin processing, whether it was performed with heat-enhanced development or developed at room temperature, did not have an impact on the results of the serological testing of the envelopes with any of the three tests that were performed.

### **Using DFO with Molecular Sieve: Preliminary Results**

**Author(s):** Schwarz, L.; Heinrich, M.; Pfannkuch, R.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 5, Pages 515-524

**Abstract:** This paper discusses tests that were conducted using molecular sieve during the application of 1,8-diazafluoren-9-one. Molecular sieve pellets suppress the formation of small watery globules that often emerge over a period of time. Moreover, if the stock solution is stored with molecular sieve, the shelf life is extended. The tests also show that molecular sieve has no negative effect on the quality of DFO treatment.

### **Accidental Characteristics in a Footwear Outsole Caused by Incomplete Blending of Fillers in the Outsole Rubber**

**Author(s):** LeMay, J.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 5, Pages 525-530

**Abstract:** Fillers in the elastomer matrix of a shoe outsole may not be completely blended into the matrix and may be more resistant to wear than the remainder of the matrix. These fillers will wear down differently from the rest of the outsole matrix, thereby creating characteristics than can individualize the footwear.

## The Bayesian Approach of Forensic Evidence Evaluation: A Necessary Form of "Survival" of the Ultimate Issue Rule in Criminal Trials

**Author(s):** Sallavaci, O.

**Type:** Article

**Published:** 2013, Volume 63, Issue 5, Pages 531-552

**Abstract:** The ultimate issue rule has been widely criticized and has been abandoned in most common law jurisdictions. Although its continuance is questioned in English criminal proceedings, this paper argues that there is scope for its survival in the context of forensic identification evidence. This paper refers to the standards for the formulation of evaluative forensic expert opinions referred to as the Bayesian approach. The founding principles of this paradigm, initially associated with the successful use of DNA evidence in criminal trials, today are widely applied in many forensic identification disciplines. This paper highlights the major contribution this model makes by shaping up the role of the expert in a criminal trial to pronouncing on the weight of evidence and not to addressing the ultimate issue. By requiring the expert to evaluate the evidence and report on the probability of the findings under a set of propositions and leaving the determination of the probability of those propositions to the trier of fact, the Bayesian approach conforms not only to logic and reason but to the legal principles too.

## Inter- and Intra-Examiner Variation in the Detection of Friction Ridge Skin Minutiae

**Author(s):** Swofford, H.; Steffan, S.; Warner, G.; Bridge, C.; Salyards, J.

**Type:** Article

**Published:** 2013, Volume 63, Issue 5, Pages 553-570

**Abstract:** Friction ridge skin minutiae (bifurcations, ridge endings, dots) and their unique arrangements are the primary information detected and evaluated by tenprint and latent print examiners when comparing unknown friction ridge skin impressions to known (record) impressions. During the analysis of friction ridge skin impressions, examiners visually detect and interpret the minutiae available for comparison to the known impression. Because this is a subjective process, the detection and interpretation of minutiae is prone to variation. Whereas earlier studies have demonstrated inter-examiner variation using impressions having a wide range of quality, this study focuses on high-quality impressions to evaluate a base-line level of variation that can be expected when detecting and interpreting friction ridge skin minutiae under optimal conditions. The standard deviation (SD) of total minutiae detected fluctuated depending on the image, whereas it was much higher for those impressions bearing breaks in the ridges as a result of creases. When comparing various examiner demographics, many of the observed inter-and intra-examiner variations in the detection of minutiae were to a statistically significant degree (95% confidence level). Although the analysis of friction ridge skin minutiae is inherently subjective, variation in the detection of minutiae may not necessarily translate into variation of examiners' conclusions nor should be necessarily considered a limitation of the discipline. Nevertheless, efforts should be made by the discipline to reduce as much variation as possible. Accordingly, these findings suggest that attention should be given towards the creation of standards and guidelines related to defining and selecting minutiae and further emphasize the importance of documenting the specific minutiae and related information detected by examiners during the analysis of friction ridge skin impressions to facilitate greater transparency of the information relied upon to reach a suitability determination or conclusion (identification, exclusion, or inconclusive).

## Impact of Minutiae Quantity on the Behavior and Performance of Latent Print Examiners

**Author(s):** Swofford, H.; Steffan, S.; Warner, G.; Bridge, C.; Salyards, J.

**Type:** Article

**Published:** 2013, Volume 63, Issue 5, Pages 571-591

**Abstract:** Although friction ridge skin is widely accepted to be unique, impressions of the friction ridge skin are not perfect reproductions of the skin and therefore will vary in their discriminating strength, depending on the quantity and quality of the minutiae and other features reproduced. Forensic examiners routinely analyze impressions and make determinations, based on their training and experience, of whether the discriminating strength of the features in an impression is such that a decision of identification or exclusion is warranted (e.g., whether the print is of value). Although minutiae quantity is not the sole factor for basing value determinations, it has been found through previous studies to play a major role. Because examiners' training and experience will vary, this study seeks to understand, in general, how examiners' decision-making behavior changes when faced with comparisons of friction ridge skin when minutiae quantity varies, but quality remains very high. The results indicate the decision-making behavior is impacted in a predictable manner between inconclusive and identification decisions (for mated sources) based on the number of minutiae present. Eighty percent (80%) or more of examiners' decisions were identification for mated sources when seven or more minutiae were present. No further increase in the relationship between examiner decision and minutiae quantity was observed for impressions with more than seven minutiae. These findings correspond well to the sufficiency chart published by the Scientific Working Group for Friction Ridge Analysis, Study and Technology (SWGFAST) in the area pertaining to high-quality impressions. Additionally, there appears to be no relationship between minutiae quantity and erroneous exclusion decisions. When presented with the same comparison twice, nine examiners (17%) changed their decision between inconclusive and the correct decision or vice versa. This study provides greater understanding of how minutiae quantity may impact examiners' decision-making behavior when faced with high-quality impressions. Although further research is needed with lower quality impressions, the results from this study suggest minutiae quantity may be a factor that forensic laboratories may consider when triaging which impressions should undergo enhanced measures of quality assurance.

## Fingermark Simulants and Their Inherent Problems: A Comparison with Latent Fingermark Deposits

**Author(s):** Zadnik, S.; van Bronswijk, W.; Frick, A.; Fritz, P.; Lewis, S.

**Type:** Article

**Published:** 2013, Volume 63, Issue 5, Pages 593-608

**Abstract:** Commercially available fingermark simulants were compared to latent fingermark deposits to assess their efficacy as standards for a quality control assessment of fingermark development reagents. Deposits of the simulants and latent fingermarks were made on paper substrates and were developed using reagents that target amino acids (ninhydrin, 1,2-indanedione) and sebaceous secretions (Oil Red O, physical developer). The resulting marks were compared for visibility and color. Significant differences were observed between the simulants and latent fingermarks in response to the fingermark development reagents. Infrared spectroscopic analysis of the simulants compared to untreated latent fingermarks revealed differences in chemical composition. These results indicate that these simulants are not well suited as quality control standards in forensic laboratories and should be used with extreme caution in any form of research into latent fingermark detection.

## The Forensic Laboratory Handbook Procedures and Practice

**Author(s):** Zercie, K.

**Type:** Book Review

**Published:** 2013, Volume 63, Issue 5, Pages 609-610

**Abstract:** Reference: Mozayani,A.; Noziglia, C., Eds. The Forensic Laboratory Handbook Procedures and Practice, 2nd ed.; Humana Press: New York, 2011, 600 pages, ISBN: 978-1-606761-871-3.

## Back to Basics

**Author(s):** Siegel, S.

**Type:** Back to Basics

**Published:** 2013, Volume 63, Issue 5, Page 616

**Abstract:** A gallery of fingerprint finds.

## Re: When Science and the Law Collide: The Legal Implications of Changed Expert Opinions.

**Author(s):** Chamberlain, M.

**Type:** Letters

**Published:** 2013, Volume 63, Issue 4, Pages 357-358

## Development of Latent Fingerprints on Fired Brass Cartridge Cases: Impact of Latent Print Development Using Acidified Hydrogen Peroxide on Forensic Firearm and Toolmark Examinations

**Author(s):** Swofford, H.J.; Paul, L.S.; Steffan, S.M.; Bonar, D.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 4, Pages 359-368

**Abstract:** Latent fingerprints developed on fired cartridge cases may serve as key pieces of evidence during forensic investigations. The success of developing latent fingerprints on fired cartridge cases, however, has been a challenge for investigators because of the nature of the firing process. Fingerprints that are deposited on cartridges prior to or while loading a weapon are likely to be destroyed by the extreme temperatures and abrasive forces caused by the firing process. Despite these odds, research has demonstrated that fingerprints, on occasion, do survive the firing process. The majority of previous research has focused on identifying various techniques to develop latent fingerprints; very little research has evaluated the down-range effects of the development techniques to forensic firearm examinations. This is of particular interest with acidified hydrogen peroxide (AHP) because it is an irreversible reaction having the potential to corrode the brass and negatively interfere with the various toolmarks linking that cartridge case back to the weapon from which it was fired. The present study evaluates the efficacy of AHP as a processing technique for developing latent prints on brass cartridge cases after they have been subjected to the firing process, the time required for development, and whether AHP processing negatively interferes with firearms examinations. These results suggest the following recommendations: (1) AHP is an effective processing technique, but should be applied after cyanoacrylate ester fuming followed by dye staining with rhodamine 6G. (2) Ridge detail, if present, can be expected to develop within 75 seconds of processing. (3) AHP processing appears to have a noticeable effect to firearms examinations in as little as 20 seconds. Therefore, coordination should be made between latent print examiners, firearms examiners, and investigators to determine the best course of action on a case by case basis.

## Sequencing of a Modified Oil Red O Development Technique for the Detection of Latent Fingermarks on Paper Surfaces

**Author(s):** Frick, A.A.; Fritz, P.; Lewis, S.W.; van Bronswijk, W.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 4, Pages 369-385

**Abstract:** A modified detection sequence is presented for the recovery of latent fingermarks on porous substrates. 1,2-Indanediol, Oil Red O (ORO) in propylene glycol, and physical developer (PD) were successfully used to develop recently deposited latent fingermarks when applied in the order given. The incorporation of ORO into the detection sequence increased the number of latent fingermarks that were detected compared to using the standard sequence of 1,2-indanediol followed by PD only.

## Application of Oil Red O Following DFO and Ninhydrin Sequential Treatment: Enhancing Latent Fingerprints on Dry, Porous Surfaces

**Author(s):** McMullen, L.; Beaudoin, A.

**Type:** Article

**Published:** 2013, Volume 63, Issue 4, Pages 387-423

**Abstract:** The recovery of fingerprints from porous surfaces is often problematic, because fingerprints cannot usually be directly lifted from such objects. As well, the fingerprints are often not visible to the naked eye. 1,8-Diazafluoren-9-one (DFO) and ninhydrin (NIN) are amino acid-specific chemicals and are widely used to visualize latent prints on such surfaces. When these two fingerprint reagents are used consecutively, more fingerprints are able to be identified. Because Oil Red O (ORO) targets lipids, the strategy is to add this reagent to the sequence DFO → NIN to enhance previously undetected latent prints on dry, porous surfaces (e.g., paper). Targeting lipids can be a valuable asset to enhance prints that contain fewer amino acids or prints that have been exposed to a humid environment. In this study, an assessment of the usefulness of ORO in the DFO → NIN sequence for dry, porous surface was conducted. The usefulness of the addition of ORO in the sequence was assessed based on its sensitivity as well as the contrast, the quality of the recovered fingerprints, and the ability of ORO to produce additional fingerprints on various paper matrices. This research demonstrated that (1) the pretreatment of evidence with DFO → NIN did influence the ORO result, but did not prevent development of useful fingerprints with the sequential process, (2) the ORO sequential treatment did present lower contrast than ORO alone, but this lower contrast did not limit the ability of the fingerprint examiner to use the print, and finally, (3) the addition of ORO following the DFO → NIN sequence enhanced fingerprints already developed with those two amino acid reagents and even developed previously undetected fingerprints. This research supports using ORO in laboratories to visualize or even locate previously undetected prints on dry, porous surfaces.

## Presenting Probabilities in the Courtroom: A Moot Court Exercise

**Author(s):** Langenburg, G.; Neumann, C.; Meagher, S.B.; Funk, C.; Avila, J.P.

**Type:** Article

**Published:** 2013, Volume 63, Issue 4, Pages 424-488

**Abstract:** At the 96th Annual Educational Conference for the International Association for Identification (IAI), held in Milwaukee, Wisconsin, a moot court exercise was conducted. In front of a live audience of approximately 300 attendees, two witnesses for the State presented a case to a mock jury. The case included the presentation of latent print evidence that, under current reporting conventions, would likely be considered as being of no value for individualization purposes. In this mock case, we explored the presentation of latent print evidence, which strength was quantified using a fingerprint statistical model. The mock jury, which consisted of 11 local laypersons with no professional knowledge of fingerprint science, heard direct examinations and cross-examinations of the witnesses. After each witness, and after closing arguments, the mock jurors answered

surveys regarding their understanding of the weight of the evidence in the case. The mock jury results were tabulated live and presented to the audience. In addition, prior to surveying the mock jury, the audience was surveyed. The present paper reports the mock jury and audience survey results. It also provides commentaries by the authors regarding their respective views on the subject and interpretations of the results.

## **Back to Basics**

**Author(s):** Siegel, S.

**Type:** Back to Basics

**Published:** 2013, Volume 63, Issue 4, Page 492

**Abstract:** This print is an accidental whorl, but two questions need to be answered before determining the tracing and what references would be needed: Is this print fully rolled from nail to nail? What is the pattern type of the opposite finger?

## **Forensic Reflected Ultraviolet Imaging**

**Author(s):** Richards, A.; Leintz, R.

**Type:** Correction

**Published:** 2013, Volume 63, Issue 3, Page 225

**Abstract:** On page 65 of the January/February 2013 issue of the Journal of Forensic Identification (volume 63, issue 1), Figure 13 and its caption were not included. The figure and caption are shown below. The author and editor apologize for this oversight.

## **An Investigation of the Effects of Laminated Glass on Bullet Deflection**

**Author(s):** Wilgus, G.; White, J.B.; Berry, J.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 3, Pages 226-232

**Abstract:** This study finds that, because of the gun and ammunition used, bullet deflection varies when penetrating a laminated windshield, but not enough to significantly alter the calculated location of a shooter. All of the rounds, with the exception of two, fell within the generally accepted range of negative five degrees to positive five degrees used in shooting reconstruction.

## **Angle of Impact Determination from Bullet Holes**

**Author(s):** Wong, K.S.; Jacobson, J.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 3, Pages 233-246

**Abstract:** This paper discusses using the shape of a bullet hole to determine the angle of impact of the bullet.

## Determining the Quality and Sustainability of Friction Ridge Deposits on Envelopes Sent Through the Postal System

**Author(s):** Holt, D.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 3, Pages 247-253

**Abstract:** This study explored the quality and sustainability of test friction ridge deposits on standard envelopes that were sent through the postal system. The test envelopes were collected and chemically treated using 1,2-indanedione with ZnCl<sub>2</sub> (IND-Zn) to develop latent fingerprint impressions. The test envelopes were assessed to determine the extent to which the deposit was present, the level of friction ridge detail, and whether any foreign superimposed fingerprints deposited during the distribution process had affected the quality of the deposit. The research provided a statistical overview whereby the greater number of deposits were strongly present (sustainable), and the majority of these deposits exhibited friction ridge detail that was suitable for comparison and identification purposes (quality). Only a relatively small number of deposits were affected by the physical handling of the test envelopes. (See letter to the editor by Dominique Holt in JFI 64 (3).)

## A Comparison Between Canine Detection of Blood Residue and Some Blood Presumptive Tests

**Author(s):** Schoon, A.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 3, Pages 255-262

**Abstract:** Because of their superior olfactory sense, trained dogs are often used in the investigation of crimes. We conducted a comparison of the sensitivity of two dogs versus three common blood presumptive tests (luminol, tetrabase, and Kastle-Meyer). The results revealed that the surface area that contained the blood contamination was an important factor. A smooth, nonporous surface (vinyl) was more difficult for dogs; some blood presumptive tests outperformed dogs on this surface. However, on a rough, porous surface (carpet), the dogs were superior. The findings cannot be directly extrapolated to field situations, but can be used in support of training dogs to enhance their sensitivity and to improve the application of blood presumptive tests.

## A Comparison of Usable Latent Fingerprints in Dust: Electrostatic Dust Print Lifter Versus Magna Powder

**Author(s):** Loewenhagen, C.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 3, Pages 263-273

**Abstract:** The use of electrostatic dust print lifters (EDPL) on several forensically relevant substrates was explored and compared against magna powder processing. The substrates were characterized in two conditions: dusty fingers pressed onto a clean surface and clean fingers pressed onto a dusty surface. The EDPL was able to collect latent dust fingerprints with usable comparable detail some of the time when magna powder processing did not.

## Natural Yellow 3: A Novel Fluorescent Reagent for Use on Grease-Contaminated Fingermarks on Nonporous Dark Surfaces

**Author(s):** Gaskell, C.; Bleay, S.M.; Ramadani, J.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 3, Pages 274-285

**Abstract:** Natural yellow 3 (curcumin) is a naturally occurring dye that is used as a food coloring. In this technical note, we show that natural yellow 3 can be incorporated into a formulation closely equivalent to that used for the blue-black fat stain solvent black 3. When this formulation is applied to surfaces, fingermarks contaminated with many types of greasy contaminant materials and sebaceous sweat become strongly fluorescent. This has potential for use on dark surfaces where greasy marks enhanced with the solvent black 3 reagent would not be readily visible.

## **The Enhancement of Fingermarks on Grease-Contaminated, Nonporous Surfaces: A Comparative Assessment of Processes for Light and Dark Surfaces**

**Author(s):** Gaskell, C.; Bleay, S.M.; Willson, H.; Park, S.

**Type:** Article

**Published:** 2013, Volume 63, Issue 3, Pages 286-319

**Abstract:** An evaluation of several processes for the enhancement of fingermarks in scenarios where greasy contamination may be present is reported. In Part 1 of this study, we found that there are differences between the classes of contaminant enhanced by individual processes and that if the type of contaminant is known, it may be possible to identify the most appropriate enhancement process. In Part 2, the optimum enhancement process for three different scenarios (contaminated mark on clean surface, natural mark on layer of contaminant, natural mark under layer of contaminant) was investigated. In some cases, processes that were highly sensitive to contaminants were most effective. In other cases, processes that did not stain the contaminant but targeted natural fingermarks gave the best results. The results indicate that there may be benefits in conducting sequential processing using one or more of the processes studied to maximize the recovery of fingermarks from grease-contaminated evidence.

## **Comparison of the Quantitative Models for Predicting Gender Using Fingerprint Ridge Counts**

**Author(s):** Jowaheer, V.; Pardassee, D.; Agnihotri, A.K.

**Type:** Article

**Published:** 2013, Volume 63, Issue 3, Pages 320-331

**Abstract:** In this study, three binary response predictive models (i.e., discriminant, logistic, and classification tree) were developed and evaluated for identifying gender using ridge counts of the fingers pertaining to the Indo-Mauritian population. The fingerprints of only three indicator fingers (i.e., index, middle, and thumb) were used. The correct prediction probability of the classification tree model was 0.94. Those of the discriminant model and the logistic model were 0.92 and 0.90, respectively. Thus, the classification tree model was ranked best and can be readily used by practitioners.

## **The Variability and Significance of Class Characteristics in Footwear Impressions**

**Author(s):** Gross, S.; Jeppesen, D.; Neumann, C.

**Type:** Article

**Published:** 2013, Volume 63, Issue 3, Pages 332-351

**Abstract:** Crime scenes often contain footwear evidence. This evidence has been used by the forensic and legal communities for many years. This project was an effort to better demonstrate the variability and measure the weight of evidence carried by class associations in footwear examinations. The trace section of the Minnesota Bureau of Criminal Apprehension (BCA) has collected 402 known footwear impressions from the past 20 years

of casework. These impressions originated from footwear from 127 different manufacturers. All impressions were compared to each other for a total of 80,601 pairs that were evaluated. The class characteristics used in these comparisons included general design element types, general outsole design, design element size-relationship, and wear. The goal of this study was to determine the variability of class associations in footwear impression evidence and to demonstrate that class characteristics alone carry high evidentiary value. Using the class characteristics present at the time of manufacture (general design element type, outsole design, and design element size-relationship), 99% of the impressions could easily be distinguished. When the class characteristic of wear was added, all 402 BCA footwear impressions were easily differentiated.

## Forensic Podiatry Principles and Methods

**Author(s):** Massey, S.L.

**Type:** Book Review

**Published:** 2013, Volume 63, Issue 3, Pages 353-354

**Abstract:** Reference: DiMaggion, J. A.; Vernon, W. *Forensic Podiatry Principles and Methods*; Humana Press, Springer, New York, 2011; 186 pages. ISBN: 978-1-61737-976-5.

## Back to Basics

**Author(s):** Siegel, S.

**Type:** Back to Basics

**Published:** 2013, Volume 63, Issue 3, Page 356

**Abstract:** As you look at this print, it is looking back at you.

## When Science and the Law Collide: The Legal Implications of Changed Expert Opinions

**Author(s):** Chamberlain, M.

**Type:** Commentary

**Published:** 2013, Volume 63, Issue 2, Pages 133-141

**Abstract:** In a criminal trial, scientific evidence often provides crucial information about the identity of the perpetrator, or answers other kinds of questions having grave implications about a person's culpability. The law needs science. Juries need expert options. As United States Supreme Court Justice Stephen Breyer noted, we live in an "age of science", and "science should expect to find a warm welcome, perhaps a permanent home, in our courtrooms" [1]. But an undercurrent of tension exists between the goals and methods of science, and those of the law. This commentary will give an overview of how the law, while depending on scientific expert testimony to adjudicate criminal cases, struggles to accommodate the reality that scientific theories, methods, and technology continue to evolve after a trial ends. When that evolution implicates a convicted defendant's guilt or innocence, the law must reconcile principles of fairness with its interest in the finality of convictions.

## Forensic Botany in the Resolution of an Agricultural Vandalism Case

**Author(s):** Hardy, C. R.; Steinhart, C. D.

**Type:** Case Report

**Published:** 2013, Volume 63, Issue 2, Pages 142-152

**Abstract:** Vehicular crop destruction is a frequent yet rarely prosecuted form of agricultural vandalism and criminal mischief in rural areas. This case illustrates the importance of the less obvious but ever-present weed flora in the forensic investigation of vehicular crop destruction. The availability and use of a trained botanist is also emphasized.

## Comparing Nearly Identical Images Using "Beyond Compare"

**Author(s):** Maloney, A.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 2, Pages 153-164

**Abstract:** A recent article outlined methods for the comparison of nearly identical images. These included a byte-by-byte comparison using specialized software as well as a visual comparison by highlighting differences in pixels between the two images based on a threshold using Photoshop. This article presents an example of image comparison and proposes another, simpler solution, using software named Beyond Compare, that may be of interest to investigators.

## Pretreatment Processing for Nonporous Items Coated with Gasoline

**Author(s):** Daniel, R.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 2, Pages 165-173

**Abstract:** Although methods exist for the processing of oil or grease prints on items of evidence, it has proven problematic and most often ill-fated to develop fingerprints on items of evidence that have been completely coated with petroleum-based products. Attempts to safely remove the contaminant, while preserving and developing the underlying fingerprints, have had little or no success. Experimentation demonstrated that heptane can effectively remove a petroleum product, such as gasoline, from nonporous surfaces, thus preparing the surface for subsequent successful latent print processing with currently accepted methods for the development of oil and grease prints.

## Exploring the Potential of Phosphorescent Fingerprint Powder

**Author(s):** Scott, J.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 2, Pages 175-187

**Abstract:** Comparisons were made between photographs of latent prints developed with phosphorescent (glow-in-the-dark) powder and photographs of latent prints developed with more traditional fluorescent techniques. In most instances, the photographs of latent prints that were developed with phosphorescent powder exhibited greater contrast. The effectiveness of tape lifting and re-processing phosphorescent prints, and using Adobe Photoshop's digital subtraction tool on photographs of phosphorescent prints, were also examined.

## Evaluation of the Impact of Different Visualization Techniques on DNA in Fingerprints

**Author(s):** Norlin, S.; Nilsson, M.; Heden, P.; Allen, M.

**Type:** Article

**Published:** 2013, Volume 63, Issue 2, Pages 189-204

**Abstract:** More than 200 latent fingerprints were deposited on various surfaces under controlled conditions and then developed using nine different visualization techniques. DNA was extracted from the fingerprints and the samples were subsequently quantified for nuclear and mitochondrial DNA content, using real-time PCR. The results show that several of the evaluated visualization techniques (e.g., Wet Powder and black fingerprint powder) do not damage DNA and allow DNA analysis to a large extent. However, some of the visualization techniques (e.g., physical developer and silver nitrate) seem to eliminate DNA completely, highly degrade DNA, or introduce inhibitors, preventing subsequent analysis. Furthermore, the results demonstrate great variation in DNA amounts detected in samples developed with the same method.

## A Study of the Variability in Footwear Impression Comparison Conclusions

**Author(s):** Hammer, L.; Duffy, K.; Fraser, J.; Daéid, N.

**Type:** Article

**Published:** 2013, Volume 63, Issue 2, Pages 205-218

**Abstract:** The 2009 National Academy of Science report, Strengthening Forensic Science in the United States: A Path Forward, cited a 1996 European study of footwear examiner conclusions and used it to illustrate that there were "considerable differences" found between conclusions of footwear examiners. The basic methodology of that study was repeated in 2009 in North America. Six footwear case studies were created and sent to participating certified footwear examiners. The examiners were asked to independently assess each case based on features that were clearly marked on each impression, and they were directed to use a specific scale of conclusions to report their findings. The results of this study, in contrast to the 1996 study, were that when experienced examiners used the same conclusion scale and compared the same features, there was little variability within their stated findings.

## Back to Basics

**Author(s):** Siegel, S.

**Type:** Back to Basics

**Published:** 2013, Volume 63, Issue 2, Page 224

**Abstract:** A previous issue featured several examples of double or split thumbs. As a follow-up, here are the thumbs and full palms from one individual.

## Photography of Faded or Concealed Bruises on Human Skin

**Author(s):** Baker, H. C.; Marsh, N.; Quinones, I.

**Type:** Article

**Published:** 2013, Volume 63, Issue 1, Pages 103-125

**Abstract:** The aim of this study was to compare four photographic techniques [visible white light, cross-polarized white light, reflected infrared (IR) light, and reflected ultraviolet (UV) light] and to evaluate their use in photographing bruises of varying visibility. In total, 75 bruises were photographed. Of these 75 bruises, 32 were a result of paintballing and were photographed 3 times over 10 days. The remaining 43 bruises were acquired through accidental trauma to the skin and were photographed on one occasion. The results from this study show that white light and cross-polarized light displayed the highest contrast significantly ( $p<0.05$ ), regardless of skin color, age of bruise, or visibility of bruise. A subjective study revealed that cross-polarized light was more efficient for visualizing bruises; the area of bruising and color of the bruise was more defined. Reflected UV photography was relatively ineffective at documenting bruises. Reflected IR photography successfully documented some bruises. On dark skin, reflected IR photography showed a greater potential to enhance bruises compared to light

skin. However, white light and cross-polarized white light still achieved better results for contrast on all skin tones.

## **Back to Basics**

**Author(s):** Siegel, S.

**Type:** Back to Basics

**Published:** 2013, Volume 63, Issue 1, Page 132

**Abstract:** The pattern type would be a loop with a ridge count of 14 and then referenced to a central pocket whorl with an inner tracing. Depending on which finger it is, it might be necessary to reference the ridge count because of the unusual ridge structure.

## **Re: Forced Condensation of Cyanoacrylate with Temperature Control of the Evidence Surface to Modify Polymer Formation and Improve Visualization.**

**Author(s):** Kent, T.

**Type:** Letters

**Published:** 2013, Volume 63, Issue 1, Pages 2-4

## **Improved Multiple Exposure and Panoramic Photography of Latent Fingerprints**

**Author(s):** Gabbay, Y.; Chaikovsky, A.; Chattah, N.; Cohen, Y.

**Type:** Case Report

**Published:** 2013, Volume 63, Issue 1, Pages 22-28

**Abstract:** In this report, we describe the improvement of the multiple exposure technique to eliminate a distracting background on a document on which a latent fingerprint was developed by DFO. We also discuss creating a composite panoramic view of a latent fingerprint developed by cyanoacrylate fuming on the curved surface of a rifle cartridge. The main goal of this paper is to demonstrate two simple, accurate, and readily available techniques for photographing latent fingerprints on complex surfaces.

## **Foot–Hand Dominance and Foot Morphology: A Comparison of the Dominant Foot with Foot Morphology and Relationship to Handedness**

**Author(s):** Kagan, B.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 1, Pages 29-40

**Abstract:** This study compares the relationship of the dominant foot with the dominant hand and compares the morphological length and width of the dominant and nondominant foot. The study disputes the assumption that there is a relationship for identification using foot dominance with hand dominance.

## **The Identification of Cell Phone Users from Latent Fingerprints**

**Author(s):** Lodhi, K.; Davis, S.; Grier, R.; Saxon, A.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 1, Pages 41-45

**Abstract:** In this study, the usefulness of cell phones as a source of latent fingerprints was investigated. Latent fingerprints were lifted from cell phones and compared to fingerprints of the owners of the phones. Identification of the cell phone user was possible in 11% of the latent fingerprints lifted from the cell phones (N = 121).

## Forensic Reflected Ultraviolet Imaging

**Author(s):** Richards, A.; Leintz, R.

**Type:** Technical Note

**Published:** 2013, Volume 63, Issue 1, Pages 46-69

**Abstract:** The use of reflected ultraviolet (UV) imaging has long been documented in the forensic literature, but little has been written about the "how" and "why" elements of using this technique in the field. This paper examines the different types of UV light and explains how and when to use different imaging techniques to visualize hidden evidence. The authors explain, in detail, the wavelength of light required, the image capturing equipment, and the type of evidence that can be examined using these techniques. (See correction in JFI 63(3))

## A 37-Year-Old Cold Case Identification Using Novel and Collaborative Methods

**Author(s):** Wedel, V.; Foiund, G.; Nusse, G.

**Type:** Case Report

**Published:** 2013, Volume 63, Issue 1, Pages 5-21

**Abstract:** Cold cases are like time capsules for law enforcement. We try to open them using the methods that have been developed since any previous attempt. In this case, a young woman, Jane Doe #48, went unidentified between her death in 1971 and her exhumation and analysis in 2008. This paper details the specialties and forensic techniques used to achieve this identification. A new method using teeth to determine age and season at death is highlighted, for this was one of the first applications of the method to a real case.

## Investigation into the Performance of Physical Developer Formulations for Visualizing Latent Fingerprints on Paper

**Author(s):** Sauzier, G.; Frick, A.; Lewis, S.

**Type:** Article

**Published:** 2013, Volume 63, Issue 1, Pages 70-89

**Abstract:** Latent fingerprints deposited on commercial photocopy paper were treated using various preparations of silver-based physical developer and the results from each were compared to those obtained with the standard formulation used by the Australian Federal Police. Five redox stock solutions were prepared with altered orders of reagent addition, and a further solution prepared with exchanged iron concentrations, to test the robustness of the method. Three redox solutions were prepared with specific reagents omitted to determine the significance of the role played by each in development. One redox solution was prepared using Tween 20 as the non-ionic surfactant to assess its suitability as a replacement for Synperonic N. An acid prewash was also prepared using malic acid as an alternative to maleic acid. Results showed the method to be robust to alterations in reagent addition, but not to significant concentration changes. The presence of all components was found to be desirable for distinguishable development of fingerprint detail. It was additionally found that Tween 20 gave at least equal performance to Synperonic N on recently deposited fingerprints. Finally, the use of malic acid gave equivalent fingerprint development but higher background in comparison to maleic acid.

## **Sequential Raman Chemical Imaging and Biometric Analysis on Fingerprints for Rapid Identification of Threat Materials and Individuals**

**Author(s):** Guicheteau, J.; Swofford, H.; Tripathi, A.; Wilcox, P.; Emmons, E.; Christesen, S.; Wood, J.; Fountain, A.

**Type:** Article

**Published:** 2013, Volume 63, Issue 1, Pages 90-101

**Abstract:** Through a collaborative effort between the United States Army Edgewood Chemical Biological Center (ECBC) and the United States Army Criminal Investigation Laboratory (USACIL), the ability to perform sequential Raman chemical imaging (RCI) and biometric analysis on fingerprints for rapid identification of threat materials and individuals was demonstrated. The chemical analysis and imaging of the fingerprints are achieved simultaneously through RCI. The fingerprint image, which bears the location and identity of the threat materials embedded within the fingerprint residue, is also suitable for subsequent biometric analysis through an automated fingerprint identification system (AFIS). In our tests, AFIS consistently generated a candidate list containing the source of the fingerprint in the top ranking position. These results mark the first step towards the practical application and implementation of RCI for chemical and biometric analyses on fingerprints routinely obtained at security checkpoints or developed during forensic counter-terrorism and drug investigations.

## **Comparison of the Cotton Wool Powdering Technique to Conventional Powdering with a Squirrel-Hair Brush**

**Author(s):** Soars, D.

**Type:** Correction

**Published:** 2012, Volume 62, Issue 6, Page 549

**Abstract:** Correction to an article on page 434 of the September/October 2012 issue of the Journal of Forensic Identification (volume 62, issue 5).

## **Computer Fingerprint Enhancement: The Joy of Lab Color**

**Author(s):** Smith, J.

**Type:** Correction

**Published:** 2012, Volume 62, Issue 6, Page 550

**Abstract:** Correction to an article on page 473 of the September/October 2012 issue of the Journal of Forensic Identification (volume 62, issue 5)

## **Detection and Processing of Pilot Pen Thermo-Sensitive Ink When Rendered Visible or Colorless**

**Author(s):** Brunetti, J.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 6, Pages 551-567

**Abstract:** Pilot Pen Corporation recently released the friction line of erasable gel pens. When the writer wishes to erase a mark, the friction caused by the rubbing of the eraser end of the pen generates heat at or above 140°F [1]. This chemically alters the composition of the ink, making it colorless to the naked eye. The colorless

writing can be restored by subjecting it to temperatures of 14°F or cooler [1]. This article examines the effects of latent print processing and DNA swabbing on Pilot's thermo-sensitive gel ink, the utilization of liquid nitrogen to restore the ink's color, and suggested screening methods for detecting intentionally concealed writing.

## Frequency of Patterns in Palms

**Author(s):** Ray, E.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 6, Pages 568-587

**Abstract:** The left and right palms of 499 individuals were classified for Level 1 pattern frequency in the interdigital, thenar, and hypothenar areas to establish a basic system for classifying palmprint patterns. Significant differences were observed in the frequency of patterns between right and left palms in the interdigital and thenar areas ( $p < 0.001$ ), but there were no significant differences in the frequency of patterns between right and left hypothenar areas ( $p > 0.05$ ). Symmetry between the right and left palms of an individual was noted in each area of the palm. The established palm classification system could be adapted to improve searches in the next generation of automated palmprint identification systems (APIS). To fully realize the capabilities of an APIS, many agencies will need additional training in how to record more complete palmprints.

## Comparison of Ortho-Tolidine and Amido Black for Development of Blood-Based Fingerprints on Skin

**Author(s):** Beaudoin, A.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 6, Pages 588-601

**Abstract:** After comparing the results obtained with ortho-tolidine and amido black for the visualization of blood-based fingerprints on pig skin, we determined that ortho-tolidine, despite its highly toxic nature, remains the best technique to use.

After testing various solutions, we determined that the solution containing sodium perborate and the remainder of a luminol solution were successful at cleaning blood stained by amido black on nonporous surfaces. These two solutions were then tested on the pig skin. Some cleaning could be achieved on pig skin after a maximum of one to two minutes after treatment, leaving a faint, bruiselike stain on the skin.

## Preliminary Study of the Comparison of Inked Barefoot Impressions with Impressions from Shoe Insoles Using a Controlled Population

**Author(s):** Hammer, L.; Nic Daéid, N.; Kennedy, R. B.; Yamashita, A. B.

**Type:** Article

**Published:** 2012, Volume 62, Issue 6, Pages 603-622

**Abstract:** Barefoot morphology comparison examines the shapes the weight-bearing areas of a foot make in its impression to try to determine whether a suspect can be excluded as the person who made a crime scene impression or included as someone who could have made the impression. In some cases, an examiner is asked to compare a suspect's barefoot impression with an impression left by a foot on the insole of a shoe. Because of the constriction of the foot caused by the shoe, the comparison is not as straightforward, and the approach to the comparison must be suitably conservative. In this paper, we provide the results of a series of experiments designed to provide some validation for this type of examination. Inked impressions were compared to inked impressions, shoe insoles were compared to shoe insoles, and, most importantly, inked impressions were compared to shoe insoles. The "like versus like" comparison results (undertaken with known inked impressions

or known shoe insole impressions) were evaluated against comparisons of inked impressions with corresponding insole impressions. The like versus like comparisons demonstrated better correspondences, and the comparison of inked impressions with shoe insoles demonstrated that the closest correspondence was for impressions made by the same person as opposed to impressions made by different people.

## A Modified Oil Red O Formulation for the Detection of Latent Fingermarks on Porous Substrates

**Author(s):** Frick, A. A.; Fritz, P.; Lewis, S. W.; van Bronswijk, W.

**Type:** Article

**Published:** 2012, Volume 62, Issue 6, Pages 623-641

**Abstract:** A simplified procedure for the recently introduced fingermark development reagent Oil Red O (ORO) is presented. This lipid-sensitive reagent offers the potential to detect latent fingermarks on porous substrates that have been exposed to water, which is not possible using the more commonly employed amino acid-sensitive reagents. Using this modified procedure, recently deposited (less than one week since deposition) latent fingermarks were readily developed on a variety of paper types. The ability to detect fingermarks on paper surfaces that had been wetted was also demonstrated. The performance of the modified ORO procedure was found to be variable in its ability to detect fingermarks that had been left exposed to the laboratory environment for periods of time greater than one week. Comparisons with the previously reported procedure for ORO found that the proposed modified procedure produced a similar degree of fingermark development. Additionally, comparisons with physical developer (PD) found that both ORO approaches performed similarly to, or better than, PD on fresh (less than one week since deposition), charged fingermarks. However, PD was the superior method for detecting both older and uncharged fingermarks.

## Latent Print Development Using Low Pressure Sublimation Vapor Deposition: Evaluation of a Prototype System

**Author(s):** Swofford, H.; Ballard, J.; Beegle, C.; Harbin, S.; Knaggs, C.

**Type:** Article

**Published:** 2012, Volume 62, Issue 6, Pages 642-659

**Abstract:** Numerous processing methods for the development of latent fingerprints have been introduced over the years, but many require hazardous and destructive chemical solvents to yield successful results. A novel technology involving a sublimation gas injection delivery system in a low pressure chamber has been developed in a prototype form that eliminates the use of chemical solvents for many of the most common processing techniques. In this evaluation, 231 latent prints were deposited and cut in half. One half was processed using the prototype system and the other half was processed using traditional methods of 7 common latent print processing techniques on 11 different substrates. The method of developing latent prints using common latent print processing techniques in the low pressure sublimation vapor deposition system developed latent prints of comparable quality to traditional processing methods. The most noteworthy improvements include safety of developing latent fingerprints on multiple forms of evidence (porous, nonporous, semiporous), no known interference with drug chemistry and DNA examinations, elimination of hazardous and destructive chemical solvents, standardization of processing regimens (controlled material or chemical concentrations and processing times) programmed into the system computer, and the convenience of using a single system for many common processing techniques used for the development of latent prints.

## A Pseudo-Operational Investigation into the Development of Latent Fingerprints on Flexible Plastic Packaging Films

**Author(s):** Downham, R. P.; Mehmet, S.; Sears, V. G.

**Type:** Article

**Published:** 2012, Volume 62, Issue 6, Pages 661-682

**Abstract:** A pseudo-operational trial using realistically handled articles was conducted at the Centre for Applied Science and Technology (CAST) to investigate fingerprint development approaches for treating flexible plastic packaging films. Vacuum metal deposition (VMD), superglue fuming followed by basic yellow 40 dye (SG/BY40), and powder suspensions were compared as primary chemical treatments. In contrast to the results of a similar trial carried out in 1986, we found that the effectiveness of VMD has diminished relative to that of SG/BY40. This is thought to be due to changes in the chemistry of the plastic material. Furthermore, the use of iron- or titanium-based powder suspension (a more modern fingerprint development process) was equivalent in effectiveness to SG/BY40. The application of different chemical and physical techniques in sequence to maximize the number of fingerprints developed was also investigated, resulting in a number of effective options including one for articles known to have been wetted.

## Back to Basics

**Author(s):** Siegel, S.

**Type:** Back to Basics

**Published:** 2012, Volume 62, Issue 6, Page 688

**Abstract:** Split thumbs (two nail joints) are treated as if the outside print was not present. Prints A and B are right thumbs and prints C and D are left thumbs.

## DNA versus Fingerprints

**Author(s):** Ferraro, J.

**Type:** Commentary

**Published:** 2012, Volume 62, Issue 5, Pages 405-408

**Abstract:** Many investigators are faced with a common question: Should I swab for touch DNA or process for fingerprints? DNA processing is on the rise and is quickly taking over the forensic world. But, is one method really better than the other? Will one be more effective in court? The purpose of this commentary is to explore the advantages and disadvantages for both fingerprints and DNA. First, let me begin with a little bit of history.

## Assessment of the Possibility of DNA Accumulation and Transfer in a Superglue Chamber

**Author(s):** Gibb, C.; Gutowski, S.; van Oorschot, R.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 5, Pages 409-424

**Abstract:** Fingerprints may contain DNA, albeit generally at low levels. It is therefore a possibility that DNA may be transferred from a print or other biological material on an exhibit being fingerprinted to an unrelated article during the application of fingerprint techniques where multiple items are processed together or after each other. One such technique is superglue fuming. This study shows that DNA can accumulate both outside and inside of a superglue fuming chamber and that DNA can transfer from one exhibit to another.

Although the level of cross contamination may be considered too low to be of great concern in most cases, any transfer has the potential to interfere with further investigation and justice outcomes. In the future, the use of more sensitive DNA profiling technologies will further increase the detectability of trace DNA contaminants. Recommendations on how the risk of contamination may be reduced are provided for consideration.

## Study on Developing Latent Fingerprints on Firearm Evidence

**Author(s):** Maldonado, B.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 5, Pages 425-429

**Abstract:** Firearms, live ammunition, and spent cartridge casings are often submitted to crime laboratories to be processed for latent fingerprints. The probability of successfully developing friction ridge detail of evidentiary value on live and spent cartridge casings is still questionable. This study focuses on the frequency and percentage of latent print recovery on firearm evidence over a two-year period at the Denver Police Department.

## Comparison of the Cotton Wool Powdering Technique to Conventional Powdering with a Squirrel-Hair Brush

**Author(s):** Soars, D.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 5, Pages 430-463

**Abstract:** The powdering of latent fingerprints with the cotton wool powdering technique was evaluated on surfaces commonly encountered by fingerprint examiners at crime scenes. In addition, a large donor study was conducted using loaded and nonloaded samples from 20 donors. Results showed the technique to be an efficient and easy-to-use method that developed prints of comparable quality to those powdered with a squirrel-hair brush. (See correction in JFI 62(6))

## Computer Fingerprint Enhancement: The Joy of Lab Color

**Author(s):** Smith, J.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 5, Pages 464-475

**Abstract:** Adobe Photoshop CS5 Extended has a selection of color modes that can help maximize the signal-to-noise ratio when digitally enhancing color images of fingerprints. This article discusses the Lab color mode in Adobe Photoshop and explains some of the benefits this dynamic mode can provide. (See correction in JFI 62(6))

## A Novel Method for the Consistent and Reproducible Deposition of Earprints: A Preliminary Study

**Author(s):** Fieldhouse, S.; Birch, C.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 5, Pages 476-487

**Abstract:** There is evidence to suggest that no two human ears are identical. They have therefore been used for human identification purposes. The quantity of force applied to an ear during the deposition of a mark is known to affect the appearance of the mark and the detail available for identification. When earmarks are recovered from crime scenes, they are commonly compared to control earprints that have been recovered using a variety of techniques that deposit earprints at multiple force quantities. A device called an earprint sampler has been developed to deposit earprints under controlled force quantities. Earprints were deposited using the earprint

sampler at force quantities between 1 to 10 newtons (N). The results suggested that the quantity of force applied did affect the appearance of the prints, but the earprint sampler offered a means of controlling the deposition process. There was no statistically significant difference in the measurements taken from multiple earprints deposited at a 10 N force ( $p > 0.05$ ), which provided evidence of repeatability.

## Latent Fingerprint Recovery from Simulated Vehicle-Borne Improvised Explosive Devices

**Author(s):** McCarthy, D.

**Type:** Article

**Published:** 2012, Volume 62, Issue 5, Pages 488-516

**Abstract:** Following the detonation of explosives to simulate two vehicle-borne improvised explosive devices (VBIEDs), the effects of blast damage to latent fingerprints deposited on items within the vehicles and on vehicle surfaces were developed and recorded. Metallic-based fingerprint powders were selected and small particle reagent (SPR) formulations were prepared by the author and evaluated as suitable development techniques in recovering the test latent impressions during these experiments. A reflected ultraviolet imaging system (RUVIS) and superglue fuming (and subsequent dye staining) were also used to develop test latent impressions. Latent fingerprints with clear friction ridge detail were developed on both VBIED experimental vehicles. Although some test latent impressions were obliterated, a large number of test impressions remained unaffected by these blast effects. The results achieved with the use of the RUVIS imager, the author's silver-grey SPR formulation, and the use of gold and copper metallic powders demonstrate the suitability of these development techniques in post-blast latent fingerprint recovery.

## Pretreatment Strategies for the Improved Cyanoacrylate Development of Dry Latent Fingerprints on Nonporous Surfaces

**Author(s):** Montgomery, L.; Spindler, X.; Maynard, P.; Lennard, C.; Roux, C.

**Type:** Article

**Published:** 2012, Volume 62, Issue 5, Pages 517-542

**Abstract:** Cyanoacrylate fuming is a popular technique commonly used by evidence examiners for the development of latent fingermarks on nonporous surfaces. The process involves the preferential formation of hard, white polycyanoacrylate along the ridgelines of the fingerprint as opposed to the substrate background. This preferential deposition results in contrast between the fingerprint and substrate. This contrast may be further enhanced through the use of staining techniques such as rhodamine 6G. Because the cyanoacrylate mechanism is believed to be initiated by fingerprint constituents and catalyzed by moisture, it follows that fingerprints subjected to harsh conditions (e.g., heat, low humidity, or UV light) often produce poorly developed results. This study aimed to further investigate and validate the use of 10% w/v methylamine as a pretreatment strategy to overcome the limitations associated with the cyanoacrylate development of dry fingerprints and to compare the results with those obtained using previously proposed pretreatment solutions. The effectiveness of this treatment was demonstrated on samples similar to those encountered in casework, and scanning electron microscopy (SEM) of the treated fingerprints confirmed the rejuvenation of the dry latent deposits through a qualitative assessment of the polymer morphology.

## Back to Basics

**Author(s):** Siegel, S.

**Type:** Back to Basics

**Published:** 2012, Volume 62, Issue 5, Page 548

**Abstract:** This print would be classified as a cuspal tented arch. The root word would be cusp, which means: a pointed end, apex, peak.

## Estimation of Original Volume of Dry Bloodstains Using Spectrophotometric Method

**Author(s):** Grafit, A.; Cohen, A.; Coen, Y.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 4, Pages 305-314

**Abstract:** Crime scene investigators are sometimes asked to estimate the blood volume spattered at the scene to assess the fatality of the incident for the victim or to assess the bloodstains' dynamics. Today, the recommended methods for the assessment of blood volume are based on empirical assumptions that may make them inaccurate or even erroneous. In this report, we offer another method of estimating the volume of blood that is based on Beer-Lambert's law, the physical law that correlates the absorption of light passing through liquid to the concentration of the absorbing substance in the liquid (at the wavelength where the absorption is maximal). This method is suited to a wide variety of surfaces and is accurate and specific for blood and might be an efficient method of solving the problem.

## Fingerprint Staining Technique on Dark and Wetted Porous Surfaces: Oil Red O and Rhodamine 6G

**Author(s):** Beaudoin, A.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 4, Pages 315-329

**Abstract:** The Oil Red O and rhodamine 6G (ORO-R6G) staining techniques can be used to reveal latent fingerprints on dark, porous surfaces that have been previously wet. Tests were carried out on five previously wet porous surfaces that were aged 0, 1, 5, and 10 days to evaluate the feasibility of this sequential treatment with ORO and then R6G. The technique is simple, inexpensive, and the results are good.

## Using Acetone to Increase Visualization of Ninhydrin-Developed Fingerprints Obscured by Common Pen Ink

**Author(s):** Coughlan, S.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 4, Pages 330-333

**Abstract:** Laboratory-grade acetone was used to remove or fade common pen ink that was obscuring details in latent fingerprints on paper developed with ninhydrin.

## Forced Condensation of Cyanoacrylate with Temperature Control of the Evidence Surface to Modify Polymer Formation and Improve Fingerprint Visualization

**Author(s):** Steele, C.; Hines, M.; Rutherford, L.; Wheeler, A.

**Type:** Article

**Published:** 2012, Volume 62, Issue 4, Pages 335-348

**Abstract:** Tests involving temperature control of both the cyanoacrylate fuming environment and the evidence surface performed at Mountain State University Forensics Program, Beckley, West Virginia, have identified conditions to improve the visualization of fingerprints. Proper temperature controls resulted in increased cyanoacrylate deposition, modification of the pseudo-crystalline structure, and increased contrast. This research program has identified a controlled micro-crystalline structure modification of the polymer formation specific to latent fingerprints. The poly-ethylcyanoacrylate polymer structure can be controlled to yield a much more visible form due to the crystalline structure under these temperature controlled environments. This research also empirically suggests that the forced condensation of the cyanoacrylate deposition follows a specific heat capacity linear curve based on the evidence material type. Different material types have demonstrated this phenomenon in controlled temperature tests and we forecast that the polymer deposition could be forced to behave in certain ways based on the type of evidence material with temperature control of the evidence surface.

The use of these forced condensation techniques via temperature control add visual detection sensitivity to evidence processing protocols. (See letter to the editor by Terry Kent in JFI 63 (1).)

## A Comparison of Three Ultraviolet Searching and Imaging Systems for the Recovery of Fingerprints

**Author(s):** Gibson, A.; Bannister, M.; Bleay, S.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 4, Pages 349-367

**Abstract:** Since the early part of the 20th century, ultraviolet (UV) radiation has been used to search and image forensic evidence. In particular, UV-C radiation (100-280 nm wavelength) was first noted to recover untreated fingerprints from porous and nonporous substrates in the 1970s, with commercial systems being developed to exploit this in the late 1990s. Advances in digital imaging technology have since revolutionized this technique, making it much more practical. This study compares the effectiveness of three imaging systems with UV-C light sources to recover fingerprints. The three systems evaluated were:

A UV-C-sensitive, back-thinned CCD and camera system

A UV-C-sensitive image intensifier

A flatbed scanner fitted with a UV-C light source

The number and quality of fingerprints recovered by the three systems were compared. Fingerprints were deposited on porous and nonporous surfaces and then were examined using the systems above, however, it was not possible to use the scanner to recover fingerprints from the nonporous surface.

The results show that the camera system with a back-thinned CCD detected the most high-quality fingerprints from the surfaces considered.

## A Crime Scene Investigator's Method for Documenting Impact Patterns for Subsequent Off-Scene Area-of-Origin Analysis

**Author(s):** Gardner, R.; Maloney, M.; Rossi, C.

**Type:** Article

**Published:** 2012, Volume 62, Issue 4, Pages 368-388

**Abstract:** Impact bloodstain patterns occur across a variety of violent crime scenes. In the hands of a trained bloodstain pattern analyst, these patterns can provide a wealth of information that may be probative to the court. Unfortunately, trained bloodstain pattern analysts are not always on scene to capture the required information or guide the crime scene investigator in deciding what stains and measurements to document. This creates a data disconnect that will eliminate the possibility for any future area-of-origin (AO) analysis effort. This article describes a documentation method for crime scene investigators to bridge this disconnect and capture sufficient information for subsequent off-scene AO analysis.

## A Pilot Study Assessing PCR Amplified Epithelial Cells Deposited on Drinking Vessels With and Without the Application of Chapstick to the Lips

**Author(s):** Latham, K.; Crescimanno, A.; Madaj, S.; Goldman, S.; Bush, G.

**Type:** Article

**Published:** 2012, Volume 62, Issue 4, Pages 389-400

**Abstract:** Although several studies have demonstrated that epithelial cells from both saliva and the skin will transfer to a touched object [1-7], no studies have systematically assessed the influence of common skin and lip protection, such as ChapStick, on the recovery of polymerase chain reaction (PCR) amplifiable DNA from inert surfaces, such as aluminum cans and ceramic mugs. This pilot study suggests that it is possible to successfully generate DNA profiles from transferred epithelial cell DNA in the presence of ChapStick residue. However, DNA quantity as detected using quantitative PCR was significantly greater from aluminum cans than from ceramic mugs. Furthermore, the effect of using lip protection varied depending on the type of drinking vessel used: the residue appears to impede DNA recovery from aluminum cans but enhance DNA recovery from ceramic mugs.

## Back to Basics

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2012, Volume 62, Issue 4, Page 404

**Abstract:** This first print was submitted by Darrell Linville (Charles County Sheriff's Office, Maryland). I was not sure what caused the appearance of the ridge detail, so I sent it to some people for help.

## Video Frame Comparisons in Digital Video Authenticity Analyses

**Author(s):** Koenig, B.; Lacey, D.; Richards, G.

**Type:** Correction

**Published:** 2012, Volume 62, Issue 3, Page 189

**Abstract:** Correction to an article on page 172 of the March/April 2012 issue of the Journal of Forensic Identification (volume 62, issue 2)

## Metamorphosis of Friction Ridge Skin

**Author(s):** Gibbs, P.

**Type:** Case Report

**Published:** 2012, Volume 62, Issue 3, Pages 191-193

**Abstract:** A fingerprint technician discovered an unusual metamorphosis of friction ridge patterns thought to be caused by an unknown chemical compound.

## Comparison of the Individual Characteristics in the Outsoles of Thirty-Nine Pairs of Adidas Supernova Classic Shoes

**Author(s):** Wilson, H. D.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 3, Pages 194-203

**Abstract:** This study was conducted on 39 pairs of running shoes (Adidas Supernova Classic, men's size 12) that were worn by one individual over approximately an 8-year time period, on similar surfaces for a similar number of miles. These shoes were examined for the presence of individual characteristics to determine whether they were able to be individualized. The results of this study support the premise that all individual or accidental characteristics are random and happen by chance, and that by using these characteristics, footwear impressions are able to be identified to a single source.

## Determining the Sensitivity and Reliability of Hemascein

**Author(s):** Lowis, T.; Leslie, K.; Barksdale, L.; Carter, D.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 3, Pages 204-214

**Abstract:** Some of the most common tests for the detection of latent bloodstains include luminol, Bluestar, and fluorescein. Hemascein is a relatively new fluorescein-based method that uses the chemiluminescent reaction between fluorescein and the heme to detect latent blood. At present, few studies have assessed the sensitivity and reliability of Hemascein. The current experiment attempted to address this issue. Human blood concentrations (neat, 1:10, 1:100, 1:1,000, 1:10,000, 1:100,000, 1:1,000,000) were deposited on a variety of surfaces (linoleum, wood paneling, whiteboard, porcelain tile, and carpet) and then tested with Hemascein. We observed Hemascein to react with the greatest reliability on blood dilution ranges of 1:1,000 to 1:100,000. Hemascein was found to be most sensitive and reliable on light-colored, smooth, flat surfaces. It was also reliable and sensitive to neat (1:1) and 1:10 dilutions of blood on dark carpet. A benefit of Hemascein is the relatively few chemical safety issues associated with its use. A drawback is a high degree of background staining if sprayed improperly. Experimental work to assess the effect of Hemascein on subsequent DNA analysis is recommended.

## Methods for Separating Duct Tape

**Author(s):** Kapila, T.; Hutches, K.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 3, Pages 215-226

**Abstract:** An experiment was designed to evaluate two things: (1) the different methods of separating duct tape from itself and (2) what effect, if any, the separating method had on the capability to recover latent prints from the adhesive side of the tape. The results showed that although several products assisted in the separation of the tape, the best overall results for obtaining latent prints were achieved with manual separation.

## The Effect of Humidity on Long-Term Storage of Evidence Prior to Using Cyanoacrylate Fuming for the Detection of Latent Fingerprints

**Author(s):** Schwarz, L.; Hermanowski, M.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 3, Pages 227-233

**Abstract:** In Germany, cyanoacrylate fuming is the most popular method used for detecting latent fingerprints on nonporous surfaces. Many articles have been written about cyanoacrylate and fingerprint detection, but it is difficult to find information about the influence of relative humidity on the quality of developed prints while storing items until fuming. The influence of humidity (30%, 54%, and 80%) while storing items at room temperature for a

period of up to six months before fuming was tested. The results indicate that the influence measured is negligible.

## Fingerprints and Firearms

**Author(s):** Pratt, A.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 3, Pages 234-242

**Abstract:** Data referencing the number of identifiable latent prints developed on firearms evidence over a three-year period was collected. The results showed a recovery rate of 13% on firearms and 7.6% on ammunition magazines. Factors that play a role in the recovery of identifiable latent prints are discussed.

## Adapting Narrow Bandpass Filters to Photography

**Author(s):** Dalrymple, B.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 3, Pages 243-253

**Abstract:** Narrow bandpass filters used in luminescence photography have often significantly increased both the amount and the clarity of fingerprint detail when a background exhibits obstructive fluorescence. An assembly of the narrow bandpass filter in combination with an orange barrier filter is described. This affords the user greater speed and convenience.

## Determining the Significance of Outsole Wear Characteristics During the Forensic Examination of Footwear Impression Evidence

**Author(s):** Bodziak, W.; Hammer, L.; Johnson, G.; Schenck, R.

**Type:** Article

**Published:** 2012, Volume 62, Issue 3, Pages 254-276

**Abstract:** This paper will define terms used in the forensic footwear examination and comparison of outsole wear, summarize past research in the area of wear, and discuss the various considerations that should be taken into account when evaluating general wear in casework comparisons. Considerations include factors that limit clarity of the impression, manufactured characteristics, and time intervals between when the impression was deposited and when the shoes were seized. A variety of general wear is encountered in footwear casework and can be used to limit the population of shoes that could have made the impression. However, general wear may appear similar on shoes of the same person and between shoes belonging to different people and therefore general wear alone should not be used to identify a shoe as the particular source of an impression. A survey conducted as part of this project indicates that general wear is not used to individualize footwear impressions by the international community of footwear examiners. (See letter to the editor in JFI 63 (5).)

## Evaluation of a Novel One-Step Fluorescent Cyanoacrylate Fuming Process for Latent Print Visualization

**Author(s):** Hahn, W.; Ramotowski, R.

**Type:** Article

**Published:** 2012, Volume 62, Issue 3, Pages 279-298

**Abstract:** The purpose of this study was to evaluate the ability of a one-step fluorescent cyanoacrylate fuming process to develop latent fingerprints in comparison with the conventional two-step processes that are currently utilized worldwide. Such two-step methods involve the use of dye stains that contain organic solvents, which have a potential to damage the developed cyanoacrylate polymer as well as an item's substrate. The method described here involves the use of a prototype modified Foster and Freeman MVC 1000 cyanoacrylate fuming cabinet and a special powder that co-fumes along with the cyanoacrylate monomer. Latent prints aged up to three weeks were placed on a number of different substrates (e.g., sandwich bags, trash bags, bubble wrap, sheet protectors, and textured plastic substrates). Preliminary results indicate that this one-step process was effective at producing quality fluorescent prints on a number of the nonporous substrates. Although there were some substrates that did not work well with this new process, for the most part, the overall quality of the development was comparable to that achieved using the current two-step fuming and dye stain procedure.

## Back to Basics

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2012, Volume 62, Issue 3, Page 304

**Abstract:** These thumbprints are from two people on opposite sides of the country. The first print was submitted by Sara Pocekay, Buena Park Police Department, CA and the second print was submitted by Ioan Truta, Boston Police Department, MA.

The classification would be a plain whorl and then referenced to an accidental whorl.

## Using a Forensic Light Source to Visualize Permanent Marker Ink After the Ink Has Been Removed

**Author(s):** Pelletier, J.

**Type:** Case Report

**Published:** 2012, Volume 62, Issue 2, Pages 105-108

**Abstract:** A forensic light source (FLS) was used to visually detect permanent marker ink that had been removed.

## Fingerprint Powders: Aerosolized Application Revisited

**Author(s):** Swofford, H.; Kovalchick, A.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 2, Pages 109-128

**Abstract:** Investigators are frequently faced with the task of processing crime scenes where the evidence cannot be readily shipped to the laboratory for analysis. In such cases, the investigator typically relies on fingerprint powders to develop latent print impressions. Conventional methods of fingerprint powder application can increase the possibility of damaging or destroying latent print impressions primarily by the application of too much powder. An alternative method of applying fingerprint powder to the surface using an aerosol spray has been introduced in the past, but yielded unsatisfactory results. Modifications in formulation and aerosol technology have rendered this technique a viable alternative, making it a less challenging and a more convenient method of applying fingerprint powder. Aerosol spray helps to control the amount of powder released while maintaining an even distribution onto the surface and decreases the amount of brush contact with the substrate surface needed to fully develop the impression thereby lessening the chance of damaging the impression. Furthermore, this method exhibits no adverse effects on deoxyribonucleic acid (DNA).

## Development of Fingerprints using Electrolysis: A Technical Report into the Development of Fingerprints on Fired Brass Cartridge Cases

**Author(s):** Nizam, F.; Knaap, W.; Stewart, J.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 2, Pages 129-142

**Abstract:** This paper examines whether electrolysis could be a useful method in the development of latent fingerprints on fired brass cartridge cases. The influence of electrolysis on galvanic metal corrosion was explored. We found that the clarity of the fingerprints was time sensitive and improved as acid concentration increased with lower duration of electrolysis.

## Bromophenol Blue as a Chemical Enhancement Technique for Latent Shoeprints

**Author(s):** McNeil, K.; Knaap, W.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 2, Pages 143-153

**Abstract:** The enhancement of two-dimensional shoe impressions, where the matrix is soil, may best be approached using chemistry. Potassium thiocyanate, which reacts with iron particles in soil, is a generally accepted development medium used by forensic investigators. Bromophenol blue, a pH indicator that reacts with carbonates in soil, is used, but with less frequency, particularly in North America. This study compared both chemistries and their ability to enhance two-dimensional shoe impressions deposited from a variety of soil samples on varying substrates. Bromophenol blue, although determined to be an inappropriate enhancement technique for brown paper samples, provided significantly more detailed enhancement than potassium thiocyanate with other tested substrates, including plastic and linoleum.

## The Development of a Wireless Electrostatic Mark Lifting Method and its use at Crime Scenes

**Author(s):** Milne, R.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 2, Pages 154-164

**Abstract:** This paper outlines the basic principles and practices involved in the technique of electrostatic dust mark lifting (ESL). Details are included about the development of a three-electrode wireless method used in some currently available commercial devices.

## Video Frame Comparisons in Digital Video Authenticity Analyses

**Author(s):** Koenig, B.; Lacey, D.; Richards, G.

**Type:** Article

**Published:** 2012, Volume 62, Issue 2, Pages 165-182

**Abstract:** The scientific authentication of digital video-audio recordings involves the examination of both the visual and acoustic information through a number of analysis steps. One step in this protocol is determining whether any of the individual images are identical to any other images within the same digital recording. Additionally, in some examinations, it is necessary to identify nonmatching pixels from nearly identical images.

These duplicate, or nearly duplicate images, could be indicative of editing, an irregularity of a specific recording device, or just identically captured and processed images. In this paper, three questions involving video frame comparisons are addressed:

Does a specific, commonly available, consumer-quality camcorder produce any identical images with a static visual view in standard and high definition modes?

Are there accurate methodologies for determining whether two recorded digital images are identical?

What digital analysis procedures are available for comparing two nearly identical images?

These questions are answered with the analysis of more than 147,100 frames from a consumer camcorder using digital data analyses and Photoshop routines. (See correction in JFI 62 (3))

## **Finger Print The Universal Religion of God**

**Author(s):** Hutchens, L

**Type:** Book Review

**Published:** 2012, Volume 62, Issue 2, Page 183

## **Back to Basics**

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2012, Volume 62, Issue 2, Page 188

**Abstract:** The first print is an accidental whorl. It has two deltas, but doesn't conform to the rules for the other types of whorls. It would be referenced to a loop.

The second print could be classified as an accidental whorl if it is thought it does not conform to the rules of the other patterns. But, it has the three essentials of a loop: a delta; ridge count across a looping ridge; and the ridges enter on one side, re-curve, and exit the same side of the print. Is it considered an accidental whorl because the ridges enter from the top rather than lower on the side of the print? There is nothing in the Science of Fingerprints that says where they have to enter, only that they must exit the same side.

You be the judge: loop or whorl first??? The only time you would be wrong is if you did not reference it.

## **Fingerprint Visualization and Spectroscopic Properties of 1,2-Indanedione-alanine Followed by Zinc Chloride or Europium Chloride**

**Author(s):** Alaoui, I. M.; Troxler, T.; Joullié

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 1, Pages 1-13

**Abstract:** We investigated the reaction product of 1,2-indanedione with alanine in methanol at room temperature using absorption, excitation, and emission spectroscopy. We observed that the pale pink color of 1,2-indanedione-developed fingerprints on papers is also present in the 1,2-indanedione-alanine methanol solution at an appropriate concentration. The addition of zinc and europium salts to the solution and to 1,2-indanedione-treated fingerprints was presented and discussed. We confirmed the laser-induced fluorescence enhancement when adding zinc to the 1,2-indanedione-alanine solution and also on 1,2-indanedione-treated fingerprints after post-treatment with zinc. However, no emission enhancement was observed with the addition of europium, even though we observed the formation of a 1,2-indanedione-alanine-Eu complex.

## Back to Basics

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2012, Volume 62, Issue 1, Page 104

**Abstract:** The classification for this print is a tented arch. The right re-curve has an appendage at the line of flow. Even if the appendage is a dot and not showing direction, the delta would be located on the only re-curve ridge. This print would not need any references.

## Comparison of Latent Print Detection using Semiconductor Laser and LED Light Sources with Three Chemical Reagents

**Author(s):** Dalrymple, B.; Almog, J.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 1, Pages 14-27

**Abstract:** A variety of light sources and reagents are available for the detection and identification of latent prints. This study was undertaken to explore the optimum light and filter combinations of laser and light-emitting diode (LED) light for use with indanedione and two new reagents, genipin and lawsone. The light sources utilized were Coherent TracER lasers operating at 460 nm, 532 nm, and 577 nm and the Rofin Polilight Flare Plus LED operating at 505 nm.

Deliberate and randomly created latent prints were first examined utilizing the light sources alone and then again following treatment with the chemical reagents. Results indicated that treatment with indanedione-zinc chloride was the most effective at the excitation of latent prints. With the exception of the 577 nm laser and genipin, the two new reagents, genipin and lawsone, did not provide useful results under test conditions. Although the LED light source revealed a significant number of untreated impressions, the laser light source proved to be more sensitive at detecting untreated impressions, and the ridge clarity was frequently higher on the samples examined. Monochromatic sources (lasers) and broadband sources such as LEDs each exhibited the potential to detect evidence missed by the other.

## Applying Anti-Stokes Phosphors in Development of Fingerprints on Surfaces Characterized by Strong Luminescence

**Author(s):** Drabarek, B.; Siejca, A.; Moszczynski, J.; Konior, B.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 1, Pages 28-35

**Abstract:** Using traditional luminescence methods to develop latent prints becomes problematic when dealing with backgrounds that demonstrate strong luminescence. In such instances, the application of time-resolved luminescence is considered a good solution. However, this technique requires the use of complicated devices that allow short-lived background fluorescence to be chopped off from a longer-lived fingerprint luminescence. This paper discusses a new and straightforward technique for the development of latent prints that involves using pigments with upconversion properties (anti-Stokes phosphors). The method requires an illumination source that emits infrared radiation.

## Identification of Identical and Nearly Identical Frames from a Lawmate PV-500 Digital Video-Audio Recorder

**Author(s):** Lacey, D.; Koenig, B.

**Type:** Case Report

**Published:** 2012, Volume 62, Issue 1, Pages 36-46

**Abstract:** This case report sets forth the preliminary examinations plus the procedures and results of a specialized data analysis to identify identical and nearly identical video frames produced in recordings from a miniature Lawmate PV-500 digital video-audio recorder. A review of five investigative recordings and test recordings from two recorders, using the native DivX MPEG-4 encoding at the recorded rate of 24 frames per second, revealed a video stream containing identical and nearly identical frames that could be identified solely by their chunk sizes within the resulting AVI files. Based upon this research, data analysis procedures can be used with Lawmate PV-500 recordings and similarly configured formats to identify consecutive identical and nearly identical frames during forensic authenticity examinations of video-audio recordings.

## **Survivability of Latent Fingerprints Part I: Adhesion of Latent Fingerprints to Smooth Surfaces**

**Author(s):** Cohen, Y.; Rozen, E.; Azoury, M.; Attias, D.; Gavrielli, B.; Elad, M.

**Type:** Case Report

**Published:** 2012, Volume 62, Issue 1, Pages 47-53

**Abstract:** A latent print was developed on an aluminum window frame more than two years after it had been deposited. The ability to develop a fingerprint after such a long time is probably due to a "fixation" phenomenon to the metal frame. To understand this unusual case, we simulated the event in the laboratory.

## **Survivability of Latent Fingerprints Part II: The Effect of Cleaning Agents on the Survivability of Latent Fingerprints**

**Author(s):** Cohen, Y.; Azoury, M.; Elad, M.

**Type:** Technical Note

**Published:** 2012, Volume 62, Issue 1, Pages 54-61

**Abstract:** The present work reports the results of experiments carried out to evaluate the effectiveness of some common commercial cleaning products on the survivability of latent fingerprints on smooth surfaces. This work disputes the assumption that latent fingerprints do not survive cleaning agents.

## **Individualization Using Friction Skin Impressions: Scientifically Reliable, Legally Valid**

**Author(s):** Swofford, H. J.

**Type:** Article

**Published:** 2012, Volume 62, Issue 1, Pages 62-79

**Abstract:** The adversarial structure of the American judicial system encourages critical reviews and challenges of forensic evidence. As a result, the discriminatory power of friction ridge skin impression evidence has been a prime target of debate among critics of the latent print discipline for years, the primary argument being friction ridge skin examination is neither scientifically reliable nor legally valid. Therefore, these critics advocate the exclusion of expert testimony to identifications from the legal system. This article reviews some long-held challenges to the science of friction ridge examination, which include challenges to the premise of friction ridge skin uniqueness, testimonial claims of individualization, reliability of comparative interpretations, errors and error rate data, and the legal admissibility according to Daubert standards. The flawed logic on which these challenges are based is presented along with evidence in response to the challenges regarding the scientific reliability and legal validity of the science of the examination of friction ridge skin examination.

## Is There a Need for 100% Verification (Review) of Latent Print Examination Conclusions?

**Author(s):** Black, J. P.

**Type:** Article

**Published:** 2012, Volume 62, Issue 1, Pages 80-100

**Abstract:** This research attempts to provide insight on the extent of verification as currently practiced within the latent fingerprint community. Ten questions were posed to this community regarding various aspects of verification; 56 agencies responded. The study results indicate that nearly every agency is performing verifications on 100% of reported fingerprint identifications. The study results also indicate that exclusion, inconclusive, and "no value" decisions are not being verified to the same extent. Interestingly, erroneous identifications constitute the minority of technical fingerprint errors, whereas erroneous exclusions, missed identifications, and inappropriate "inconclusive" and "no value" decisions are far more numerous.

## Computer-Aided Courtroom Presentation of Shoeprint Comparison

**Author(s):** Izraeli, E; Wiesner, S.; Shor, Y.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 6, Pages 549-559

**Abstract:** A simple, yet powerful method is described to aid the presentation of shoeprint comparisons in court. This method uses Adobe Photoshop Elements or other similar software for image processing and Microsoft PowerPoint for the presentation in court. The PowerPoint presentation will enable the expert to show the test impressions overlapping the prints, gradually change the opacity of the test impression on the print, and slightly move the test impression to imitate in great accuracy the comparison and evaluation process done in the laboratory.

## Differentiation of Color Photocopy Toners using TLC, UV, and FTIR Techniques

**Author(s):** Saini, K.; Saroa, J. S.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 6, Pages 561-580

**Abstract:** In this study, an attempt was made to differentiate 28 processed color toners and 10 raw samples using thin-layer chromatography (TLC), ultraviolet spectroscopy (UV), and fourier transform infrared (FTIR) spectroscopy. When all of these methods were used, most of the toners were able to be differentiated.

## The Gelatin Lifting Process: An Evaluation of its Effectiveness in the Recovery of Latent Fingerprints

**Author(s):** Bleay, S. M.; Bandey, H. L.; Black, M.; Sears, V. G.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 6, Pages 581-606

**Abstract:** A study has been conducted into the effectiveness of the gelatin lifting process for the recovery of latent prints. The theory of the process is presented, followed by a series of experiments to investigate different aspects of its performance. These include a direct comparison of the effectiveness of gelatin lifting versus

powdering and gelatin lifting, an investigation of the effectiveness of the process on different surfaces, experiments to establish the effect of the age of the print and the storage method on latent print quality, and tests to establish the potential position of gelatin lifting within sequential treatment regimes. It is concluded that gelatin lifting does have potential applications for latent print recovery, in particular on heavily contaminated surfaces or as a nondestructive process on surfaces that cannot easily be chemically treated, such as electrical equipment. Gelatin lifting without powdering is not as effective as powdering, but it works well on a range of nonporous surfaces, especially on smooth surfaces. The effectiveness of the technique reduces as the age of the latent print increases, and it was found that storage of the lift without a cover is best for preserving the lifted impression. Gelatin lifting may have a detrimental effect on some subsequent development processes, so its use in sequential processing should be considered carefully.

## **Forensic Light Source and Environmental Effects on the Performance of 1,2-Indanedione-Zinc Chloride and 1,8-Diazafluoren-9-one for the Recovery of Latent Prints on Porous Substrates**

**Author(s):** Lam, R.; Wilkinson, D.

**Type:** Article

**Published:** 2011, Volume 61, Issue 6, Pages 607-620

**Abstract:** This study compared split depletion latent prints, aged up to 12 weeks, from multiple donors on a variety of substrates to determine whether 1,8-diazafluoren-9-one should be replaced with 1,2-indanedione-zinc chloride as the Royal Canadian Mounted Police's standard chemical latent print development technique for porous exhibits. It was found that 1,2-indanedione-zinc chloride developed more latent prints, which also appeared to be more brightly fluorescent than those of 1,8-diazafluoren-9-one. The performance of 1,8-diazafluoren-9-one was reduced in high relative humidity, whereas 1,2-indanedione-zinc chloride did not seem to be affected by changes in relative humidity. The solid state laser revealed the most latent prints, however the MiniCrimeScope and the Polilight were both comparable to the laser. The RCMP is conducting a nationwide field trial to validate this method for casework.

## **Comparison of Different Physical Developer Working Solutions – Part I: Longevity Studies**

**Author(s):** Houlgrave, S.; Andress, M.; Ramotowski, R.

**Type:** Article

**Published:** 2011, Volume 61, Issue 6, Pages 621-639

**Abstract:** Physical developer (PD) is a widely used chemical processing technique for the development of latent prints on dry or wetted porous surfaces. The objective of Part I of this research was to verify that the United States Secret Service (USSS) formulation for PD will outlast the 7- to 10-day shelf life that is mentioned by some practitioners. The USSS recently changed the nonionic surfactant from Synperonic N to Tween 20, which appears to have improved the longevity of the working solution. This research compared fresh and aged batches of working solutions using both nonionic surfactants and determined that PD working solutions incorporating Synperonic N had a shelf-life ranging from 10 to 15 days, whereas PD working solutions incorporating Tween 20 had a shelf life of approximately 2 ½ months. In addition, Part II of this research will discuss the importance of reliability testing to determine the stability of the reagent and comparisons conducted between two different reliability test solutions, gold chloride (AuCl<sub>3</sub>) and EDTA tetra sodium salt.

## **Comparison of Different Physical Developer Working Solutions – Part II: Reliability Studies**

**Author(s):** Houlgrave, S.; Ramotowski, R.

**Type:** Article

**Published:** 2011, Volume 61, Issue 6, Pages 640-651

**Abstract:** Physical developer (PD) is a widely used chemical processing technique for the development of latent prints on dry or wetted porous surfaces. Part I of this research compared fresh and aged batches of PD working solutions using two nonionic surfactants, Syneronic N and Tween 20, and determined that PD working solutions incorporating Syneronic N had a shelf life ranging from 10 to 15 days, whereas PD working solutions incorporating Tween 20 had a shelf life of approximately 2 ½ months. The objective of Part II of this research was to discuss the importance of reliability testing to determine the stability of a reagent and comparisons conducted between two different test solutions, gold chloride (AuCl<sub>3</sub>) and EDTA tetra sodium salt. This study determined that gold chloride test solutions degrade on Whatman #2 filter paper as well as in solution, whereas EDTA tetra sodium salt test solutions degrade much slower on Whatman #2 filter paper and appear to remain stable in solution.

## Identification of Wax Esters in Latent Print Residues by Gas Chromatography-Mass Spectrometry and Their Potential Use as Aging Parameters

**Author(s):** Koenig, A.; Girod, A.; Weyermann, C.

**Type:** Article

**Published:** 2011, Volume 61, Issue 6, Pages 652-676

**Abstract:** Recent studies show that the composition of fingerprint residue varies significantly from the same donor as well as between donors. This variability is a major drawback in latent print dating issues. This study aimed, therefore, at the definition of a parameter that is less variable from print to print, using a ratio of peak area of a target compound degrading over time divided by the summed area of peaks of more stable compounds also found in latent print residues.

Gas chromatography-mass spectrometry (GC/MS) analysis of the initial lipid composition of latent prints identifies four main classes of compounds that can be used in the definition of an aging parameter: fatty acids, sterols, sterol precursors, and wax esters (WEs). Although the entities composing the first three groups are quite well known, those composing WEs are poorly reported. Therefore, the first step of the present work was to identify WE compounds present in latent print residues deposited by different donors. Of 29 WEs recorded in the chromatograms, seven were observed in the majority of samples.

The identified WE compounds were subsequently used in the definition of ratios in combination with squalene and cholesterol to reduce the variability of the initial composition between latent print residues from different persons and more particularly from the same person. Finally, the influence of a latent print enhancement process on the initial composition was studied by analyzing traces after treatment with magnetic powder, 1,2-indanedione, and cyanoacrylate.

## Position of the European Fingerprint Working Group (EFPWG) of the European Network of Forensic Science Institutes (ENFSI) Regarding the NRC report

**Author(s):** Meuwly, Dr. D.

**Type:** Special Feature

**Published:** 2011, Volume 61, Issue 6, Pages 677-679

## Back to Basics

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2011, Volume 61, Issue 6, Page 688

**Abstract:** There is ridge detail at the very tip of this thumb. Be aware if you are searching a print, deltas can be found on any part of the friction ridge surface.

## Purported Drug Cartel Use of Vultures as a Method for Body Disposal

**Author(s):** Hamilton, M. D.; Spradley, M. K.

**Type:** Case Report

**Published:** 2011, Volume 61, Issue 5, Pages 425-429

**Abstract:** A series of photographs, purported to show Colombian drug operatives disposing of a rival by using flocks of vultures to consume the entire body, was disseminated within law enforcement, border control, and intelligence communities. The images were examined for contextual information, and an analysis shows the sequence is not indicative of drug cartel activities, but reflects a culturally accepted Tibetan funerary practice. The findings are discussed to better enable members of the law enforcement and forensic communities to recognize this document as a depiction of a religious mortuary tradition and not of body disposal activities currently in use by drug operatives.

## Meeting the Fingerprint Admissibility Challenge in a Post-NAS Environment

**Author(s):** Eldridge, H.

**Type:** Case Report

**Published:** 2011, Volume 61, Issue 5, Pages 430-446

**Abstract:** Since the release of the 2009 NAS report, the fingerprint community has been trying to come to terms with a new paradigm for presenting conclusions in court. Commonly used phrases have been deemed inappropriate and fingerprint examiners have been left unsure of what they should say. In June of 2010, I testified in a Daubert-style motion to exclude fingerprint evidence, in which NAS report concerns figured prominently. Following the hearing, my testimony was ruled admissible without limitations. This article discusses the issues that were raised and describes the ways in which I addressed them. It is hoped that this article will serve as a primer and reference for those who find themselves faced with similar challenges.

## Personalization and Calibration of the Control Question in the Control Question Test

**Author(s):** Jaworski, R.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 5, Pages 447-467

**Abstract:** This article discusses the control question test (CQT) that is used in polygraph examination. The author proposes an additional test to select control questions that have emotional significance to approximate those of the relevant questions in a CQT. The concept is based on a set of questions concerned with various morally reprehensible actions, including one that is concerned with the current event. The test's questions that cause the greatest changes in physiological parameters would be introduced as control questions in the prepared CQT. This would enable a selection of control questions that are best suited to the subject's age, his or her legal and emotional situation, as well as criminal record (personalization). Additionally, this would enable a mathematical comparison between the extent of the reaction to the question about the current event and the reactions following the questions about morally reprehensible behavior. The determined proportions could be taken into account during the analysis of the results of the CQT proper. The author discusses several cases when such a test was applied and presents their records.

## Using Bluestar Forensic to Detect Shoe Movement Transfer of Cleaned Up Blood

**Author(s):** Leintz, R. C. B.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 5, Pages 468-476

**Abstract:** An experiment was conducted to determine whether investigative personnel walking on a surface that had been contaminated with blood and then cleaned would transfer the deposited heme onto a nonbloody surface, thus causing a chemiluminescence on the nonbloody surface. No transference of deposited heme was visualized using Bluestar Forensic, regardless of the number of re-entries created by researchers.

## Trough Pattern Frequency in Blue and Black Gel Ink Pens

**Author(s):** White, K. T.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 5, Pages 477-485

**Abstract:** The purpose of this research was to visually examine the frequency and individuality of trough patterns when writing with blue and black gel ink pens. This research examines the trough pattern in conjunction with various substrates and how they may influence the frequency. This research also seeks to determine the reliability of trough patterns as a distinguishable feature for the differentiation of gel inks from others.

## Using and Articulating the Scientific Method in Bloodstain Pattern Analysis

**Author(s):** Latham, H. M.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 5, Pages 487-494

**Abstract:** A discussion of the scientific method, as it is applied in bloodstain pattern analysis, is presented to assist the analyst in recognizing and communicating the various steps and the significance of his or her conclusion.

## Using Reflected Infrared Photography to Enhance the Visibility of Tattoos

**Author(s):** Duncan, C. D.; Klingle, C.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 5, Pages 495-519

**Abstract:** The identification of deceased persons is an important responsibility of both crime scene and death investigators. Frequently, investigators must comb through missing persons reports to match up common features (e.g., scars, marks, and tattoos) or pathologists may have to rely on such distinctions to identify a body. However, environmental and time factors often make the identification of bodies difficult at best. As the body begins to putrefy and decompose, unique identifiers such as tattoos may go completely unnoticed. As the body passes through the various stages of decomposition, tattoos may become less and less visible. Fortunately, investigators can photograph these hidden or latent tattoos using infrared lighting techniques to create sharply focused photographic images of tattoos that may assist in identifying an unknown person.

## **The Recoverability of Fingerprints on Nonporous Surfaces Exposed to Elevated Temperatures**

**Author(s):** Dominick, A. J.; NicDaeid, N.; Bleay, S. M.

**Type:** Article

**Published:** 2011, Volume 61, Issue 5, Pages 520-536

**Abstract:** Previous work by the authors compared the effectiveness of ninhydrin, 1,8-diazafluoren-9-one (DFO), and physical developer (PD) as enhancement reagents for fingerprints deposited on paper that had been exposed to elevated temperatures. This research extends the previous study and investigates the recoverability of fingerprints deposited onto glass and ceramic surfaces in order to mimic the environment these surfaces may be exposed to within a fire scene.

This research has shown that ridge detail is still retrievable from ceramic after exposure to 800 °C (1472 °F) for 20 minutes, although, at temperatures in excess of 350 °C (662 °F), ridge detail would only survive if the fingerprints had been protected from direct exposure to radiant heat and direct air flow across the surface. This investigation has shown that the most effective enhancement technique overall was found to be superglue followed by BY40 at all temperatures except 200 °C (392 °F) in which case, iron powder suspension was superior. However, superglue followed by BY40 may have to be excluded as a prospective enhancement technique for many situations because the nonporous surface may become wet during firefighting activity. The use of silver vacuum metal deposition has been demonstrated to develop fingerprints after exposure to higher temperatures and may have future potential for this application.

## **Black Robes, White Coats: The Puzzle of Judicial Policymaking and Scientific Evidence by R. C. Harris**

**Author(s):** Harmon, R. P.

**Type:** Book Review

**Published:** 2011, Volume 61, Issue 5, Pages 537-538

## **Age Estimation of the Human Skeleton by K. E. Latham; M. Finnegan**

**Author(s):** Anderson, B. E.

**Type:** Book Review

**Published:** 2011, Volume 61, Issue 5, Pages 539-540

## **The Last Place You'd Look: True Stories of Missing Persons and the People Who Search for Them by Carole Moore**

**Author(s):** Craig, E.

**Type:** Book Review

**Published:** 2011, Volume 61, Issue 5, Pages 541-542

## **Back to Basics**

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2011, Volume 61, Issue 5, Page 548

## **Validation of Vinyl Static Cling Film for the Collection and Preservation of Dust Impressions**

**Author(s):** Lemay, J.; Adams, S.; Stephen, A.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 4, Pages 317-332

**Abstract:** The use of vinyl static cling film (VSCF) to collect dust impressions on a variety of surfaces is compared to the use of an electrostatic dust lifter (ESDL). The VSCF produces slightly better results and provides a more economical method of collecting dust prints.

## **Reasoning, the Scientific Method, and Bloodstain Pattern Analysis – Assuring that the Questions are being Answered Correctly**

**Author(s):** Latham, H. M.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 4, Pages 333-340

**Abstract:** A bloodstain pattern analyst uses reasoning and the scientific method to reach reliable and unbiased conclusions. The scientific method is applied by making observations, collecting data, analyzing the data, forming hypotheses or theories, testing the hypotheses and theories, and drawing conclusions. While applying the scientific method, the analyst will employ logic and reasoning to answer questions that the data and observations will generate along the way. Understanding logic and reasoning will aid the analyst in making reliable and defendable conclusions when using the scientific method.

## **Search Results of Heat-Distorted Fingerprints using Sagem Metamorpho AFIS**

**Author(s):** Dominick, A. J.; NicDaeid, N.; Gibson, A. P.; Bleay, S. M.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 4, Pages 341-352

**Abstract:** This research investigated the results of searching fingerprints that had been distorted by heating the recipient surface. Fingerprints were deposited on uPVC, which was then exposed to sufficient heat to cause distortion of the substrate. The fingerprints were distorted vertically and horizontally as a consequence of the flow of uPVC resulting from the exposure to heat. Photographic images were taken of the fingerprints before and after distortion, and both sets of images were loaded into the Sagem Metamorpho AFIS. Successful matches were obtained in a number of cases. The results indicated that the quality of the fingerprint before heating influenced the matches of the distorted fingerprint. The results also showed that the fingerprints on vertically distorted substrates had more accurate search results than the horizontally distorted substrates. This research has shown that successful searches can be achieved from fingerprints recovered from substrates distorted by heat, providing the initial fingerprint is of good quality.

## **A Comparison of Reagents for the Visualization of Blood Prints on Knives with Black Handles**

**Author(s):** Bouwmeester, M.; Gorré, S.; Rodriguez, C.; de Puit, M.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 4, Pages 352-362

**Abstract:** In this study, three reagents (amido black 10b, SPR-W, and acid yellow 7) were compared to visualize blood prints on black-handled knives. The blood prints were developed with these reagents one day and three weeks after the blood prints were deposited on the knives. The SPR-W showed the best results on the three different black surfaces.

## Development of Aged Latent Prints on Envelopes

**Author(s):** Smith, S.; Sebetan, I. M.; Stein, P. C.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 4, Pages 363-372

**Abstract:** Envelopes (aged less than 1 year to 21 years) were processed using 1,8-diazafluoren-9-one (DFO), ninhydrin, and 1,2-indanedione. The latent prints that developed were scored according to ridge detail. The DFO produced prints on 35% of the 20 envelopes processed and 10% had latent prints that were considered identifiable. The ninhydrin produced prints on 40% of the 20 envelopes processed and 15% had latent prints that were considered identifiable. The 1,2-indanedione produced prints on 95% of the 20 envelopes processed and 50% were considered identifiable. These differences were statistically significant (P value < .05, chi-square test). Interestingly, there was no difference (P value >.05) in the ability to detect identifiable latent prints on the aged envelopes (16 to 19 years old, N=19; 11 to 14 years old, N=58) compared to the newer envelopes (< 5 years old, N=22). The 1,2-indanedione method was shown to be the best process to use for developing aged latent prints on envelopes.

## The GYRO System — A Recommended Approach to More Transparent Documentation

**Author(s):** Langenburg, G. M.; Champod, C.

**Type:** Article

**Published:** 2011, Volume 61, Issue 4, Pages 373-384

**Abstract:** The GYRO documentation system offers a simple and efficient method for a friction ridge examiner to document the analysis and comparison stages of the ACE-V process. GYRO uses a color-coding system to convey the analyst's degree of confidence in the existence of a feature and the degree of variation to which that feature may appear in a corresponding exemplar print. We also explore the benefits and utility of the PiAnoS software, which bears some similarity to GYRO, but with added tools.

## Latent Fingerprint Quality: A Survey of Examiners

**Author(s):** Hicklin, R. A.; Buscaglia, J.; Roberts, M. A.; Meagher, S. B.; Fellner, W.; Burge, M. J.; Monaco, M.; Vera, D.; Pantzer, L. R.; Yeung, C. C.; Unnikumaran, T. N.

**Type:** Article

**Published:** 2011, Volume 61, Issue 4, Pages 385-418

**Abstract:** A survey of latent print examiners was conducted to determine how they assess fingerprint quality. Participating examiners performed detailed anonymous assessments of both the local and overall quality characteristics of latent and exemplar fingerprint images, using a custom-designed software application. Eighty-six latent print examiners from federal, state, local, international, and private sector laboratories each spent 8 to 12 hours assessing the quality of approximately 70 fingerprint images. The fingerprints were overlapping subsets of 1,090 latent and exemplar fingerprint images derived from the National Institute of Standards and Technology (NIST) Special Database 27 and a Federal Bureau of Investigation (FBI) Laboratory dataset of images. An analysis of the results shows the extent of consistency between examiners in value determinations; the relationships between the overall perceived quality of a print and the size of clear ridge detail; and the

relationships between quality, size, and correct pattern classification. An analysis of the examiners' subjective assessments of fingerprint quality revealed information useful for the development of guidelines, metrics, and software tools for assessing fingerprint quality.

## Back to Basics

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2011, Volume 61, Issue 4, Page 424

**Abstract:** This print is a seven-count loop. The loop is not over the tented arch. It can be referenced to a whorl with an outer tracing.

## Can ACE-V Be Validated?

**Author(s):** Speckels, C.

**Type:** Commentary

**Published:** 2011, Volume 61, Issue 3, Pages 201-209

## Credit Where It's Due

**Author(s):** MacDonell, H. L.

**Type:** Commentary

**Published:** 2011, Volume 61, Issue 3, Pages 210-221

## Agave americana: A Prickly Prospect for CSIs

**Author(s):** Burroughs, A. K.; Vincent, M. J.

**Type:** Case Report

**Published:** 2011, Volume 61, Issue 3, Pages 222-225

**Abstract:** Foliage is often used to both beautify and protect businesses and residences from unwanted trespassers, but the forensic value of the plants is often overlooked. Here, we examine the prospect of obtaining latent fingerprint information from the native cactus *Agave americana*.

## Documenting and Reporting Inconclusive Results

**Author(s):** Maceo, A. V.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 3, Pages 226-231

**Abstract:** In a latent print unit, documenting and reporting identifications and exclusions is relatively straightforward. Inconclusive results, however, tend to be a bit more challenging because the meaning of and reason for the inconclusive result can be so varied. It has been the author's experience that many agencies and latent print analysts struggle with the documentation and reporting of inconclusive results. The purpose of this paper is to share one method of defining, documenting, and reporting inconclusive results that the author has

found successful in a latent print unit. The author also recommends some quality assurance procedures associated with inconclusive results.

## Design of a Control Slide for Cyanoacrylate Polymerization: Application to the CA-Bluestar Sequence

**Author(s):** Thiburce, N.; Becue, A.; Champod, C.; Crispino, F.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 3, Pages 232-249

**Abstract:** Casework experience has shown that, in some cases, long exposures of surfaces subjected to cyanoacrylate (CA) fuming had detrimental effects on the subsequent application of Bluestar. This study aimed to develop a control mechanism to monitor the amount of CA deposited prior to the subsequent treatment. A control slide bearing spots of sodium hydroxide (NaOH) of known concentrations and volume was designed and validated against both scanning electron microscopy (SEM) observations and latent print examiners' assessments of the quality of the developed marks. The control slide allows one to define three levels of development that were used to monitor the Bluestar reaction on depleting footwear marks left in diluted blood. The appropriate conditions for a successful application of both CA and Bluestar were determined.

## Development of Bloody Prints on the Adhesive Side of Duct Tape

**Author(s):** Aronson, C. K.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 3, Pages 250-259

**Abstract:** Bloody prints were observed on the adhesive side of a roll of duct tape in a homicide case. We were unsure how the methods for blood enhancement processes for the development of prints in blood would react with the adhesive surface. A test was conducted to determine the most effective technique to develop these prints. This test compared several different methods used in latent processing for adhesive surfaces versus methods generally employed for blood enhancement. Amido black proved to be the best method for developing bloody prints on the sticky side of duct tape.

## A Fluorogenic Method for Lifting, Enhancing, and Preserving Bloody Impression Evidence

**Author(s):** Zarate, J.; Morden, C.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 3, Pages 260-280

**Abstract:** This paper describes the use of Zar-Pro fluorogenic lifting strips that can be used on bloody impression evidence. These easy-to-use strips successfully lift and enhance bloody impressions from a variety of substrates, regardless of porosity or background color. The lifting strips are highly sensitive and fluoresce when coupled with proteins and excited with an alternate light source.

## Recovery of Fingerprint Evidence from Post-Blast Device Materials

**Author(s):** Sanders, N.; Waltenbaugh, D. R.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 3, Pages 281-295

**Abstract:** This paper examines and discusses some factors associated with the recovery of fingerprint evidence from post-blast device materials. The work describes some of the materials used in the construction of explosive devices, the explosive effect as it relates to the recovery of latent fingerprints, and tests conducted during a post-blast investigations training course. The tests included the initiation or explosion of a variety of devices containing different explosive charges and methods of initiation. Forty-two patent and latent fingerprints were placed into the devices to determine the possibility of recovering fingerprints. The post-blast recovered items were then processed with cyanoacrylate fuming and powders, Wetwop, or leucocrystal violet. Five of the 42 control prints were developed.

## A Methodology for Three-Dimensional Quantification of Anterior Tooth Width

**Author(s):** Johnson, L. T.; Radmer, T. W.; Visotcky, A. D.; Ahn, K. W.; Blinka, D. D.; Wirtz, T.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 3, Pages 296-310

**Abstract:** The use of cone-beam computed tomography (CBCT) technology has been shown to be more accurate in measuring individual incisor tooth widths than the use of wax exemplars. There were fewer differences by investigators using CBCT than others using an F-test in a mixed model of the measurement differences of investigators, wax type, and which tooth was measured. In addition, the frequency of outliers was less in the CBCT method (a total of 5) as compared to the two-dimensional measurements in ether Aluwax (a total of 8) or Coprwax (a total of 12). Both results indicate that CBCT measurements accounted more precisely for tooth width and level of eruption.

## Back to Basics

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2011, Volume 61, Issue 3, Page 316

**Abstract:** This print is an accidental whorl with an outer tracing. What makes it interesting is the placement of the third delta.

## AFIS Searching of Impressions from Charred Friction Ridge Skin

**Author(s):** Nursall, J.

**Type:** Letters

**Published:** 2011, Volume 61, Issue 2, Pages 109-111

## Using Projective Geometry to Estimate Body Height from Closed-Circuit Television (CCTV) Recordings: A New Method

**Author(s):** Brolund, P.; Bergstrom, P.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 2, Pages 112-122

**Abstract:** In this paper, a new method for estimating the body height of persons recorded on closed-circuit televisions (CCTV) is introduced. The method is based on the earlier work of Criminisi [1], but instead of

estimating the vanishing line from parallel lines, the vanishing line is estimated from vertical distances of known height. Furthermore, additional information is provided by performing a reference recording of a standard reference tool using the same CCTV system that was used to record the original sequence. This approach increases the accuracy of the estimations. The method was tested in typical CCTV conditions with an average deviation of 0.18 cm and a standard deviation of 0.49 cm. For all estimated heights, the actual height fell within the estimated confidence interval.

## One-Sided Impact Spatter and Area-of-Origin Calculations

**Author(s):** Maloney, A.; Nicloux, C.; Maloney, K.; Heron, F.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 2, Pages 123-135

**Abstract:** It is common practice when calculating area of origin from impact spatter to use stains from both "sides" of the pattern – stains to the left and to the right of the blood source. Impact spatter at crime scenes, however, often provides the analyst with bloodstain patterns that are not as pristine as those created in a controlled environment. One situation that may arise is impact spatter consisting of stains from only one side of the pattern because of the removal of an object after the impact, such as a door or a person, or because the stains from one side are not on a planar surface. This study looks at a method of calculating the area of origin using stains from only one side of the pattern and shows that these partial patterns may still provide usable calculations to determine the area of origin.

## Comparison of Smears of Wax-Based Products using Thin-Layer Chromatography and Microspectrophotometric Detection

**Author(s):** Ismail, D.; NicDaeid, N.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 2, Pages 136-146

**Abstract:** This work introduces a rapid and effective technique for the discrimination of smears of colored wax-based products (e.g., lipstick and shoe polish) on fabrics. Forty-two samples of commonly available wax-based products were analyzed. The analytical technique used was a combination of thin-layer chromatography (TLC) and direct microspectrophotometry (MSP) of the subsequent TLC plate. The resultant data was analyzed using self-organizing feature mapping (SOFM), an artificial neural network system. The combination of TLC and MSP facilitated the discrimination of all samples, and the SOFM system provided an easy-to-understand visual representation of the sample discrimination by type.

## Analysis of Fingerprints Using a Color-Coding Protocol

**Author(s):** Laird, A.; Lindgren, K.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 2, Pages 147-154

**Abstract:** The National Bureau of Investigation Forensic Laboratory (NBI) developed a color-coding system to simplify and standardize fingerprint analysis and comparison reports. The system has also proven useful as a training aid, because trainees are now able to more accurately demonstrate to a training officer their understanding of what they see.

## A Comparison of Six Fingerprint Enhancement Techniques for the Recovery of Latent Fingerprints from Unfired Cartridge Cases

**Author(s):** Dominick, A. J.; Laing, K.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 2, Pages 155-165

**Abstract:** This work compared the effectiveness of six different enhancement methods on six different sizes of brass cartridges. One sebaceous fingerprint was deposited onto 25 of each size of cartridge to enable a statistical evaluation of the enhancement methods for each cartridge size to be undertaken.

The enhancement methods compared were cyanoacrylate fuming (CA) followed by brilliant yellow dye staining (BY40), CA followed by gun blue (GB) followed by BY40, GB only, CA followed by palladium deposition, palladium deposition only, and powder suspension. The six sizes of cartridges used in this study were .22 cal, .32 cal, 9 mm, .38 cal, 12 gauge ribbed shotgun, and 12 gauge smooth shotgun.

Two techniques provided the best results: (1) CA followed by GB followed by BY40 and (2) CA followed by palladium deposition. These two enhancement techniques were also compared statistically and no statistical difference in their effectiveness was found, suggesting that both techniques are equally as effective at enhancing fingerprints on brass cartridge cases.

## Use of Physical Developer for the Visualization of Latent Fingerprints

**Author(s):** de Puit, M.; Koomen, L.; Bouwmeester, M.; de Gijt, M.; Rodriguez, C.; van Wouw, J.; de Haan, F.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 2, Pages 166-170

**Abstract:** We monitored the performance of the physical developer technique as an addition to the DFO-ninhydrin sequence for the development of latent fingerprints. The results described in this article contribute to our belief that the physical developer technique is a valuable addition to the sequence in our laboratory.

## Investigation of the Reproducibility of Third-Level Characteristics

**Author(s):** Anthonioz, A.; Egli, N.; Champod, C.; Neumann, C.; Puch-Solis, R.; Bromage-Griffiths, A.

**Type:** Article

**Published:** 2011, Volume 61, Issue 2, Pages 171-192

**Abstract:** The process of comparing a fingermark recovered from a crime scene with the fingerprint taken from a known individual involves the characterization and comparison of different ridge details on both the mark and the print. Fingerprint examiners commonly classify these characteristics into three different groups, depending on their level of discriminating power. It is commonly considered that the general pattern of the ridge flow constitutes first-level detail, specific ridge flow and minutiae (e.g., ending ridges, bifurcations) constitutes second-level detail, and fine ridge details (e.g., pore positions and shapes) are described as third-level detail. In this study, the reproducibility of a selection of third-level characteristics is investigated. The reproducibility of these features is examined on several recordings of a same finger, first acquired using only optical visualization techniques and second on impressions developed using common fingermark development techniques. Prior to the evaluation of the reproducibility of the considered characteristics, digital images of the fingerprints were recorded at two different resolutions (1000 and 2000 ppi). This allowed the study to also examine the influence of higher resolution on the considered characteristics. It was observed that the increase in the resolution did not result in better feature detection or comparison between images. The examination of the reproducibility of a selection of third-level characteristics showed that the most reproducible features observed were minutiae shapes and pore positions along the ridges.

## Crime Scene to Court: The Essentials of Forensic Science

**Author(s):** Fisher, B. A. J.

**Type:** Book Review

**Published:** 2011, Volume 61, Issue 2, Pages 193-194

### Back to Basics

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2011, Volume 61, Issue 2, Page 200

**Abstract:** This pattern has a third delta. The first impression might be accidental whorl. The classification would be central pocket whorl with an inner tracing, because the delta on top does not have a re-curve.

## PKU Card: A New Tool in the Search for Missing and Unidentified Individuals

**Author(s):** Parmelee, K. J.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 1, Pages 1-3

**Abstract:** PKU cards can be a source of DNA and may provide an accurate reference for comparison to unidentified remains.

### Back to Basics

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2011, Volume 61, Issue 1, Page 108

**Abstract:** The primary classification would be a plain arch referenced to a tented arch. It depends on what is going on at point "A". The ridge at point "A" bifurcates and flows from the left to the right; it does not form an angle or recurve. There is no recurve or obstruction at right angles in front of delta "B". The dot does not show any direction so there is no upthrust. You could reference it to a whorl or a loop, but it would not be necessary.

## Studies Toward the Development of a Positive Control Test for the Cyanoacrylate Fuming Technique Using Artificial Sweat

**Author(s):** Velthuis, S.; de Puit, M.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 1, Pages 16-29

**Abstract:** In our studies toward the development of a positive control test for the cyanoacrylate fuming technique, we carried out experiments with artificial sweat. The sweat was produced by dissolving several organic compounds that represented natural sweat. We found that amino acids, in general, react well with the fumes of cyanoacrylate, and fatty acids react rather poorly. We also found that the hydroxyl moiety of lactic acid reacts better with the fumes of cyanoacrylate than with the acid functionality.

Using Indanedione-Zinc, Heat, and G3 Solution Sequentially to Detect Latent Fingerprints on Thermal Paper

**Author(s):** Schwarz, L.; Hermanowski, M. L.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 1, Pages 30-37

**Abstract:** The detection of latent fingerprints on thermal paper is difficult because the active layers turn dark as a result of having come into contact with heat or some common chemical solutions that are used for fingerprint detection. This article shows that the dark staining resulting from the use of indanedione-zinc or heat can be successfully reversed by the application of the discoloration solution "G3".

## The Effects of Bluestar on the Kastle-Meyer Presumptive Test for Blood

**Author(s):** Vaughan, J.

**Type:** Technical Note

**Published:** 2011, Volume 61, Issue 1, Pages 38-49

**Abstract:** Bluestar Forensic is an effective latent blood reagent used by forensic investigators in the field. The purpose of this study was to investigate whether using Bluestar could affect the results of the Kastle-Meyer test used in forensic laboratories as a presumptive test. The Kastle-Meyer test is applied to samples that have been subjected to chemical blood reagents in the field. In this study, blood dilution sets were created with concentrations from neat to 1:1,000,000 on clean, white, 100% cotton cloth. Each dilution set was subjected to Bluestar and to the Kastle-Meyer test consecutively. After the initial applications of Bluestar to the sample sets, the Kastle-Meyer reagents produced positive results for blood. The sets were then kept for approximately two months at varying conditions. The sample sets were then tested again with both Bluestar and the Kastle-Meyer test. The findings of this study support the hypothesis that Bluestar does not affect the results of the Kastle-Meyer test when controlling for time and environment of samples stored.

## Fingerprinting a 2,500-Year-Old Egyptian Mummy

**Author(s):** Knaap, W.; Turner, J. M.; Gallant, A.; Knaap, L.

**Type:** Case Report

**Published:** 2011, Volume 61, Issue 1, Pages 4-15

**Abstract:** The authors were permitted to examine and record friction ridge detail from a 2500-year-old mummy. Reprorubber and Accutrans casting materials were used to record the ridge detail from the thumbs and a finger. This was completed without damage to the fragile mummy.

## Oil Red O: Fingerprint Development on a 21-Year-Old Cold Case

**Author(s):** Beaudoin, A.

**Type:** Case Report

**Published:** 2011, Volume 61, Issue 1, Pages 50-59

**Abstract:** Background information about Oil Red O (ORO) and a brief case description involving evidence being processed after 21 years and recovering two good-quality latent impressions are presented.

## Consistency and Variability Among Latent Print Examiners as Revealed by Eye Tracking Methodologies

**Author(s):** Busey, T.; Yu, C.; Wyatte, D.; Vanderkolk, J.; Parada, F.; Akavipat, R.

**Type:** Article

**Published:** 2011, Volume 61, Issue 1, Pages 60-91

**Abstract:** We recorded the eye positions of 18 expert latent print examiners and 18 novice participants across two separate experiments that were designed to represent abbreviated latent print examinations. In the first experiment, participants completed self-paced latent and inked comparisons presented on a computer monitor while their eyes were tracked with a commercial eye tracker. The similarity of eye fixation patterns was computed for each group of subjects. We found greater variability under some conditions among the experts than the novices in terms of the locations visited. However, experts spent approximately 50% longer than novices inspecting the images, which may have led to differences in strategies adopted by the two groups. A second experiment used trials that always lasted 20 seconds and found that under these time-controlled circumstances, experts were more consistent as a group than novices. Experts also had higher accuracy, spent a greater proportion of time inspecting the latent prints, and had shorter saccades than novices. However, the two groups spent an equal time looking at regions that contained minutiae. The results are generally consistent with experts relying on a common set of features that they choose to move their gaze to under time-limited conditions.

## The Efficacy of Submitting Fingerprints of Unidentified Human Remains to Federal Agencies

**Author(s):** Mulawka, M. H.; Craig, J. S.

**Type:** Article

**Published:** 2011, Volume 61, Issue 1, Pages 92-101

**Abstract:** Fingerprints from 109 unidentified human remains (UHR) cases at the San Diego County Medical Examiner's Office were submitted to two fingerprint agencies to determine whether a significant number of additional identifications would occur from this effort. Fifty-one persons (47%) were identified as a direct result of this study, including several cold cases dating back as far as 1979.

## Re: Wertheim, K.; Maceo, A. The Critical Stage of Friction Ridge and Pattern Formation. J. For. Ident. 2002, 52 (1)

**Author(s):** Wertheim, K.

**Type:** Letters

**Published:** 2010, Volume 60, Issue 6, Pages 601-602

## Improved Methods of Visible Hyperspectral Imaging Provide Enhanced Visualization of Untreated Latent Fingerprints

**Author(s):** Plesé, C. A.; Exline, D. L.; Stewart, S. D.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 6, Pages 603-618

**Abstract:** Improvements in hyperspectral imaging data collection and processing of latent fingerprints have been found to yield superior results to those previously obtained with a similar method. Hyperspectral imaging was used as a method of visualizing untreated latent fingerprints on both porous and nonporous substrates. A percent contrast calculation was applied to the unprocessed and processed hyperspectral images as a way to

quantify the increased contrast between the fingerprint ridges and the background after the processing steps had been applied as compared to the unprocessed images. Hyperspectral imaging was successful with the visualization of various levels of ridge detail of latent fingerprints on paper, aluminum foil, and black tape substrates, yielding resultant processed images that portrayed an average of 42.8% improved image contrast between the fingerprint ridges and the substrate background. This work is valuable in cases where fingerprints need to be visualized without development techniques for the purpose of preserving the substrate or the integrity of the print itself.

## Steam Development of Latent Fingerprints on Thermal Paper

**Author(s):** Bissonnette, M.; Knaap, W.; Forkiotis, C. J.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 6, Pages 619-638

**Abstract:** The purpose of this study was to use a novel steam technique to develop latent fingerprints on thermal paper. Several factors were investigated including the mechanism of reaction, the effect of time since fingerprint deposition, and the ability to develop fingerprints on thermal paper obtained from a variety of sources. The mechanism of the reaction was found to be a reaction with unsaturated lipids from sebaceous secretions such as unsaturated fatty acids and squalene. The steam technique was effective at developing fingerprints up to four weeks since deposition. Steam developed identifiable fingerprints on a wide variety of thermal paper, with a success rate of 41% overall. These results are comparable to other techniques used in law enforcement today. It was concluded that the steam technique is a viable method for developing latent fingerprints on thermal paper.

## Development of Standardized Test Strips as a Process Control for the Detection of Latent Fingermarks using Physical Developers

**Author(s):** Kupferschmid, E.; Schwarz, L.; Champod, C.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 6, Pages 639-655

**Abstract:** Physical developer (PD) is a detection method for latent fingermarks on porous surfaces. This method presents several difficulties in its application (e.g., the instability of the PD solutions or the risk of obtaining strong background coloration on certain types of paper). In view of these difficulties, a test strip has been developed that contains four fields of ascorbic acid at different loadings and one field of oleic acid. The fields on the test strips were applied using a modified inkjet printer, which guarantees a high reproducibility, small variation of the loading per surface area, and allows the production of a large number of test strips. Experiments with different PD solutions were conducted to test the correlation between the quality of the fingermark development and the number of fields made visible on the test strips. The correlation was shown to be high. The test procedure is easy and quick to apply and makes the application of PD more predictable.

## Analysis of the Suitability of the iPrep DNA Purification Instrument for Routine Forensic Applications

**Author(s):** Leo, W.; Grimley, K.; Peralta, Z.; Kobilinsky, L.; Lents, N. H.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 6, Pages 656-681

**Abstract:** This study sought to analyze the potential utility of the automated iPrep DNA purification instrument in routine forensic applications by subjecting this robotic DNA extraction method to a rigorous comparison study using common biological samples and simulated forensic evidence. Because the Chelex-based DNA preparation protocol is the most commonly used method for routine nonchallenging biological samples, we used this method

as the basis of our comparison. In so doing, we found that the iPrep instrument reliably produced high-quality DNA samples from a broad array of biological inputs, while significantly saving time and reducing technician sample handling.

## Detecting Bloodstains under Multiple Layers of Paint

**Author(s):** Howard, M. C.; Neumann, C

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 6, Pages 682-717

**Abstract:** Using five different techniques [alternate light source (ALS), infrared (IR), BlueStar Forensic, luminol, and fluorescein], bloodstain patterns were detected beneath layers of paint. As a source of visualization and documentation, photographs were taken of the results. Results of this experiment show that all five techniques were effective in detecting bloodstain patterns beneath layers of paint.

## The Enhancement and Recovery of Footwear Marks Contaminated in Soil: A Feasibility Study

**Author(s):** Croft, S.; NicDaeid, N.; Savage, A.; Vallance, R.; Ramage, R.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 6, Pages 718-737

**Abstract:** Little published research has been conducted on the chemical enhancement of soil-contaminated footwear marks. Investigations into the application, including the advantages and limitations of processes available for the enhancement of footwear marks in soil, were carried out as part of this study. This included a comparison of current enhancement solutions such as potassium thiocyanate, ammonium pyrrolidine dithiocarbamate, potassium ferrocyanide, and bromophenol blue. The solutions were compared on the basis of sensitivity, sharpness of the color reaction, and their application to a range of commonly encountered substrates. The best-performing chemical enhancement technique for footwear impressions in soil was found to be potassium thiocyanate. Potassium thiocyanate was further explored to study the effects of aging the mark deposited as well as assessing the stability (shelf life) of the solution. The age of the mark appeared to have no significant effect on its ability to be chemically enhanced using potassium thiocyanate. The stability study of potassium thiocyanate revealed that, although aged solutions still enhanced footwear marks, background staining, fading, and deterioration in color sharpness were all observed.

## The Documentation of a Large Outdoor Crime Scene with a Large Number of Footwear Impressions: Their Analysis and Comparison

**Author(s):** Lemay, J.

**Type:** Case Report

**Published:** 2010, Volume 60, Issue 6, Pages 738-747

**Abstract:** A large outdoor crime scene with 143 footwear impressions in a dirt and gravel driveway was documented using photographic and diagramming techniques. There were 22 known individuals who had entered the scene, potentially leaving footwear impressions. The author was able to associate 136 of the footwear impressions to the shoes of those 22 individuals. A color-coded diagram was produced to illustrate the locations of the footwear impressions at the crime scene and the shoes that could have made the impressions.

## A Uniform Protocol to Address Unidentified Human Remains and Missing Persons

**Author(s):** Mulawka, M. H.; Sebetan, I. M.; Stein, P. C.

**Type:** Article

**Published:** 2010, Volume 60, Issue 6, Pages 748-757

**Abstract:** This study was conducted to determine whether a uniform protocol could be developed to aid in streamlining the process of identification. Many avenues currently available were examined and combined to create a comprehensive and universal procedure that can be followed by any agency or organization tasked with identification in the forensic science community.

## Standard for the Validation and Performance Review of Friction Ridge Impression Development and Examination Techniques

**Author(s):** SWGFAST

**Type:** Special Feature

**Published:** 2010, Volume 60, Issue 6, Pages 758-764

**Abstract:** (To Replace: Validation of Research and Technology, ver. 1.0)

## The Distribution of Anti-Felon Identification Tags

**Author(s):** Medley, L.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 5, Pages 501-509

**Abstract:** Less lethal weapons, such as the Taser electronic control device, are frequently used by law enforcement agencies to overcome suspect resistance. As a means of regulating the use of Thomas A. Swift Electric Rifle (Taser) electronic control devices, Taser International Inc. has issued each cartridge with tiny confetti-like pieces that include a cartridge-specific, alphanumeric serial number known as anti-felon identification tags (AFIDs). The Department of Justice has suggested that a sample of AFIDs are to be collected from the scene and treated as forensic evidence each time a cartridge is discharged. However, there has been no clear justification for this task beyond the simple tracking of the cartridge assigned to the individual law enforcement agency. The purpose of this study was to map out the AFID distribution patterns from multiple Taser test fires to determine whether it would be possible to reconstruct a Taser deployment. The results of this initial study indicate that even under controlled conditions, AFID distributions are random and provide only a vague image of the crime scene.

## RAY Dye Stain Versus Gentian Violet and Alternate Powder for Development of Latent Prints on the Adhesive Side of Tape

**Author(s):** Wilson, H. D.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 5, Pages 510-523

**Abstract:** This research addresses a new method of processing the adhesive side of tape after it has been exposed to cyanoacrylate fumes. The adhesive sides of various types of tape were processed with gentian violet, alternate powder, and RAY (rhodamine, ardrox, basic yellow) dye stain, following cyanoacrylate fuming. Tests of the RAY dye staining technique were done, both prior to and after processing with gentian violet and alternate powder. The RAY dye stain was the superior method for processing the adhesive side of tape after

cyanoacrylate fuming, and the optimal results were obtained after the tape had been processed with gentian violet and alternate powder. (See letter to the editor by Terry Kent in JFI 57 (2).)

## Distinguishing Bloodstains from Botanic Stains Using Digital Infrared Photography

**Author(s):** Xiao, R.; Zhao, X.; Zhu, X.; Zhang, L.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 5, Pages 524-531

**Abstract:** Using digital infrared imaging, bloodstains on fabrics can be distinguished from similar looking stains of plant origins.

## A Study of Pyridyldiphenyl-triazine as a Chemical Enhancement Technique for Soil and Dust Impressions

**Author(s):** Ross, E.; Gorn, M.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 5, Pages 532-546

**Abstract:** A formulation of pyridyldiphenyl-triazine (PDT) called Ferrotrace was proposed as an alternative to chemical enhancement techniques (i.e., ammonium thiocyanate) of soil or dust footwear impression evidence. The PDT in Ferrotrace reacts with ferrous iron and is used in the criminalistics field to detect firearm contact impressions on suspected shooters' hands. Ferrotrace was compared with ammonium thiocyanate using ferrous solutions and produced results that were sensitive. Soil samples were tested with Ferrotrace and ammonium thiocyanate, and the results were compared. The color reaction produced with ammonium thiocyanate was more distinguishable and reproducible, so Ferrotrace was not recommended as an alternative to ammonium thiocyanate.

## Fingerprinting Cadavers with ReproRubber

**Author(s):** Burke, E.; Knaap, W.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 5, Pages 547-556

**Abstract:** ReproRubber is a synthetic material sold by Flexbar Corporation. It is routinely marketed as a casting material for replicating internal and external machinery parts. Its use in fingerprinting cadavers was investigated. Although fingerprint powder is significantly cheaper and more efficient when taking fingerprints (because no setting time is required), this research revealed that ReproRubber replicated more friction ridge detail, especially with digits that required rehydration.

## Postmortem Dismemberment in Two Mediterranean Countries

**Author(s):** Kahana, T.; Aleman, I.; Botella, M.; Novoselsky, Y.; Volkov, N.; Hiss, J.

**Type:** Case Report

**Published:** 2010, Volume 60, Issue 5, Pages 557-572

**Abstract:** A scrutiny of 25 cases of body dismemberment of homicide victims analyzed at the National Centre of Forensic Medicine (Israel National Police, Israel) and at the Laboratory of Anthropology of the University of Granada (Spain) provides an insight into various aspects of this type of postmortem mutilation. The common

features regarding anatomical location of the severing cuts, the most commonly used tools, and the motivation behind the act of postmortem dismemberment are discussed and compared. The taphonomic changes detected in 24% of these cases indicate the use of some type of refrigeration associated with concealment of the body sections.

## **Audio Extraction from Silicor Technologies' Digital Video Recorder File Format**

**Author(s):** Lacey, D. S.; Koenig, B. E.

**Type:** Case Report

**Published:** 2010, Volume 60, Issue 5, Pages 573-588

**Abstract:** Our laboratory received four proprietary (".wva") audio-video files from a Silicor Technologies, Inc. digital video recorder for analysis. The manufacturer's playback software lacked the capability to digitally export audio information and only allowed audio to be output through real-time playback of the files through a computer sound card. To permit a digital export, analyses were performed to establish the data's format within the files, locate the audio segments, and automate an accurate extraction using an appropriate scripting process. The prepared extraction script produced a rapid method for copying the audio information from the files, audio files usable for authenticity, and files containing additional recorded audio information that was not present during real-time playback.

## **Tire Tread and Tire Track Evidence — Recovery and Forensic Examination**

**Author(s):** Schenck, R.

**Type:** Book Review

**Published:** 2010, Volume 60, Issue 5, Pages 589-590

## **Forensic Field Techniques for Human Remains: An Introduction**

**Author(s):** Murray, E.

**Type:** Book Review

**Published:** 2010, Volume 60, Issue 5, Pages 591-594

## **Back to Basics**

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2010, Volume 60, Issue 5, Page 600

**Abstract:** This print would be classified as a central pocket whorl with a meeting tracing and referenced to a plain whorl. It could also be referenced to a 9-count loop. Thank you to CID AFIS Tech Gerri Green with the Nebraska State Patrol for the submission.

## **Back to Basics**

**Author(s):** Siegel, S. D.

**Type:** Correction

**Published:** 2010, Volume 60, Issue 4, Page 393

**Abstract:** On page 392 of volume 60 (3), it states, "This pattern has two equally good looping formations with one delta." It further states that this pattern "is classified as a tented arch and then referenced as necessary". After several discussions, it was concluded that the pattern does meet the definition of a double loop whorl referenced to a loop. The pattern does have two equally good looping formations, two deltas, and a ridge count across each looping ridge. One delta (which is a short or ending ridge) is above the looping formation on the right. It allows a ridge count (01) across the left looping ridge. The other delta (which is a bifurcation) is just below the looping formation on the right. It allows a ridge count (03) across the right looping ridge and the two intervening ridges. These types of discussions are fun and make pattern interpretation interesting. Thank you to David R. Cotton, FBI-CJIS Division, for bringing this to my attention.

## Production and Evaluation of a Dark Magnetic Flake Powder for Latent Fingerprint Development

**Author(s):** Nag, K.; Liu, X.; Scott, A.; Sandling, G.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 4, Pages 395-407

**Abstract:** Highly reflective magnetic iron flakes are suitable for visualizing latent fingerprints on dark, textured surfaces. However, there is a need for a darker variety of this magnetic flake powder that would be suitable for obtaining good contrast on light background surfaces. A novel dark magnetic flake powder was therefore developed by vibration milling, and the powder was then evaluated for latent fingerprint development. This evaluation indicated that a darker variety of magnetic flake powder, obtained by dry milling with an optimum stearic acid, provided good-quality results for fingerprint development.

## Utilization of Enhancement Software for Visual Analysis in Two and Three Dimensions\*

**Author(s):** Head, J.; Titunik, I.; Kobilinsky, L.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 4, Pages 408-429

**Abstract:** A laboratory protocol using three enhancement software products has been developed for the analysis of photographic evidence. Photographs of two bite marks produced by different subjects and two wax registration impressions were scaled to 1:1 using Photoshop 6.0 (Adobe Software, Inc., San Jose, CA). The images were then enhanced with Lucis 4.2.1 (Image Content Technology, Groton, CT), a software product that reveals variations in luminance and displays the patterns of contrast present in an image. After Lucis enhancement, the images were analyzed with Measurement of Internal Consistency Software 2.0 (MICS) (LumenIQ, Inc., Bellingham, WA), which allows two-dimensional photographic images to be viewed in a third dimension. The 1:1 enhanced images of the bite impressions were compared to wax registration impressions using an acetate overlay comparison method. Detail in the bite pattern was revealed and clarified by enhancement with both Lucis and MICS. The benefit of the protocol lies in its ability to view physical evidence in three dimensions with various viewing positions.

## Optimization of a DNA Extraction Method for Nonhuman and Human Bone

**Author(s):** Coticone, S.; Barna, L.; Teets, M.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 4, Pages 430-438

**Abstract:** The present study involves the use of ultrasonic technology to rapidly and effectively extract trace amounts of DNA from bones. This method not only extracts DNA but also preserves its integrity because there is

no heating or foaming during the automated extraction process. Additionally, because the system is self contained, there is minimal risk of contamination. This technique allows for the extraction of DNA from bones using acoustic energy which can be manipulated using two different parameters (duty cycle and amplitude). Using pig bones, different acoustic settings were tested to determine which combination produces the highest yield of amplifiable DNA after the entire extraction procedure has been completed. Pig and human DNA were successfully extracted from bones and amplified using this procedure. The results demonstrate the ability to obtain DNA from bone samples using acoustic energy.

## **Making Three-Dimensional Footwear Test Impressions with "Bubber"**

**Author(s):** Lemay, J.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 4, Pages 439-448

**Abstract:** Footwear examiners occasionally find it necessary to make three-dimensional test impressions of footwear when they are comparing the footwear to photographs of three-dimensional crime scene impressions. There are several products available for such use. Some are polymers that require mixing and hardening. Some are foam products that do not render fine detail. A new product, Bubber, was tested and was found to be very easy to use. It rendered very fine detail that could be photographed and cast with dental stone.

## **The Forensic Application of High Dynamic Range Photography**

**Author(s):** Brown, K. C.; Bryant, T.; Watkins, M.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 4, Pages 449-459

**Abstract:** This paper demonstrates two methods to produce superior photographic images by combining three to five photographs taken at different exposures. Creating high dynamic range (HDR) images in Photoshop CS4 or Photomatix Pro 3 software results in high-quality 32-bit images. HDR images can include a tonal range beyond that which can normally be captured in a single image. This technique provides the forensic examiner with more detailed images for comparisons and examinations.

## **Screening Potential Latent Fingerprint Examiner Trainees: The Viability of Form Blindness Testing**

**Author(s):** Bertram, D.; Carlan, P.; Byrd, J. S.; White, J.

**Type:** Article

**Published:** 2010, Volume 60, Issue 4, Pages 460-476

**Abstract:** This study examines form blindness testing as a predictor of latent print examination success among college students. Two form blindness tests and a latent fingerprint comparison test were administered to students trained ( $N = 160$ ) and untrained ( $N = 167$ ) in the science of fingerprinting. Six independent variables (pattern recognition test, form blindness scale, science and nonscience major, grade point average, corrective vision, and age) were assessed to measure their influence (if any) on student performance on a latent fingerprint comparison test. Results showed that fingerprint training does assist (to some degree) form-blind individuals; however, fingerprint comparison scores were still significantly lower for students with increasing form blindness, even after controlling for the influences of age, corrective vision, grade point average, and science major. From the results, the authors conclude that form blindness testing does appear to be an efficient tool for the recruitment and selection of fingerprint comparison trainees.

## **The Foundations for the Discipline of Bloodstain Pattern Analysis — A Response to the Report by the National Academy of Sciences**

**Author(s):** Gardner, R. M.; Griffin, T. J.

**Type:** Article

**Published:** 2010, Volume 60, Issue 4, Pages 477-494

**Abstract:** Scientific publications dealing with the field of bloodstain pattern analysis (BPA) have existed for more than a century. As such, the discipline is one of the oldest existing forensic investigative aids. The objective of this paper is two-fold: (1) through succinct statements to present a structured foundation of the principles applied in the discipline of bloodstain pattern analysis and (2) to address statements in the National Academy of Sciences (NAS) 2009 report on the state of forensic science in the United States, specifically addressing the validation efforts directed at these principles over the last 115 years.

## **Back to Basics**

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2010, Volume 60, Issue 4, Page 500

**Abstract:** The joints of the fingers are unusual. The medial joints of the index, middle, and ring fingers appear to be longer than average and the little finger has an extra joint. This submission is from Rodolfo Zamora who was with the Mesa Police Department in 1998 when the prints were submitted.

## **Back to Basics**

**Author(s):** Siegel, S. D.

**Type:** Correction

**Published:** 2010, Volume 60, Issue 3, Page 269

**Abstract:** On page 268 of volume 60 (2), it stated "This print will be classified as an accidental whorl. There is one recurve in front of the center delta. It would be referenced to a plain whorl." The correct reference would be to a double loop whorl. Thank you to David R. Cotton, FBI-CJIS Division for bringing this to my attention.

## **Book Review: Bloodstain Pattern Analysis With An Introduction to Crime Scene Reconstruction**

**Author(s):** Chisum, J.

**Type:** Letters

**Published:** 2010, Volume 60, Issue 3, Pages 271-279

## **The Use of BackTrack for the Directional Analysis of Shotgun Pellet Patterns**

**Author(s):** McClorry, S.; Kastelic, A.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 3, Pages 280-290

**Abstract:** Forensic identification officers encounter shotgun pellet patterns at crime scenes, and it is sometimes beneficial to have knowledge of the location from where the firearm was discharged. Currently, bloodstain experts use a computer program called BackTrack to determine the origin of a bloodstain pattern. Our investigation revealed that the mathematical relationship employed by BackTrack to determine the angle of impact can be applied to impacts from a pellet gun into BIO-FOAM (one-sample t-test; n=102, p=0.057). However, it would not be feasible to utilize BackTrack to determine the origin of a shotgun pellet pattern because the calculated muzzle-to-target distance was often an order of magnitude off of the known distance and thus would not be reliable.

## Differentiation of Blue Gel Inks Using Adobe Photoshop

**Author(s):** Deitz, N.; Quarino, L.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 3, Pages 291-307

**Abstract:** The increase in popularity of gel ink pens has made the development of methods for their identification and differentiation necessary. Though multiple methods (e.g., thin-layer chromatography, high-performance liquid chromatography, and alternate light sources) have been applied, they have not resulted in a large degree of discrimination because most gel inks are nonsoluble pigmented inks. Discrimination of gel inks may be possible through the use of computer programs, such as Adobe Photoshop, which are nondestructive and produce quick results. In this study, thirty-six blue gel inks were analyzed using the three modes available through Adobe Photoshop: RGB (red-green-blue), CMYB (cyan-magenta-yellow-black), and Lab. Visualization of differences was improved through alterations of the input levels and by using the channel mixer. The thirty-six inks were able to be separated into twenty-five groups using these methods.

## DNA Swabs from Vehicles: A Study on Retention Times, Locations, and Viability of Identifying the Most Recent Driver

**Author(s):** Wu, D.; Crichton, A.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 3, Pages 308-319

**Abstract:** The purpose of this investigation was to determine which areas on a vehicle provide the best DNA results to identify the last driver. Of the four locations swabbed, the exterior driver's door handle and the steering wheel were the best in terms of identification. The gear shift and rear-view mirror yielded either no types or complex mixtures with no clear major donor.

## An Investigation of Isatin as a Potential Reagent for Latent Fingermark Detection on Porous Surfaces

**Author(s):** Chan, J.; Shimmon, R.; Spindler, X.; Maynard, P.; Lennard, C.; Roux, C.; Stuart, B.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 3, Pages 320-336

**Abstract:** This study investigated isatin as a potential fingermark enhancement reagent for use on porous surfaces. A number of parameters were investigated, including concentration, solvent system, pH of the solution, and optimization of the development conditions. It was determined that isatin at a concentration of 0.05% (w/v) provided the optimum balance between the luminescence of the fingermark ridges and background. A carrier solvent of dioxane mixed with acetone [12.5% (v/v)] produced the most intense luminescence. It was determined that the optimum pH for the development of fingermarks was 5.0 and that this could be reached by the addition of 4% (v/v) sodium carbonate buffer. The use of a dry heat press at 180 °C for 10 s provided optimal

development conditions. The possible enhancement of isatin-treated fingermark impressions using metal salts was investigated and it was determined that secondary treatment with an ethanolic zinc chloride solution provided enhanced luminescence emission. However, little color change to the developed fingermarks was observed. A comparison of isatin with 1,2-indanedione-zinc (IND-Zn) and DFO demonstrated that the latter two reagents provided greater sensitivity and luminescence than isatin despite the fact that isatin generated strong room-temperature luminescence.

## Counterfeit Nike Sneakers

**Author(s):** Wisbey, D.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 3, Pages 337-351

**Abstract:** The popularity of Nike Air Force One sneakers has resulted in the sneaker being a common brand submitted for footwear examination. In the course of the examination process, footwear examiners have contacted the Nike Corporation for manufacturing details. In some cases, Nike was unable to provide information because of the sneaker being counterfeit. This paper will highlight some methods to assist the footwear examiner in assessing the likelihood that the submitted sneaker may be counterfeit.

## If the Shoe Fits: An Illustration of the Relevance of Footwear Impression Evidence and Comparisons

**Author(s):** Lemay, J.

**Type:** Case Report

**Published:** 2010, Volume 60, Issue 3, Pages 352-356

**Abstract:** It is the author's experience that footwear impression evidence is misunderstood and undervalued when an identification cannot be made. The author uses a case example to illustrate just how significant a conclusion of "this shoe could have made this impression" is and how unlikely it is that there may randomly be two pairs of shoes of the same physical size, same outsole design, and same degree of wear at one geographic location.

## The Restoration of Impressed Characters on an Aluminum Alloy Motorcycle Engine

**Author(s):** Dower, G.; Gutowski, S. J.; Sammut, S.

**Type:** Case Report

**Published:** 2010, Volume 60, Issue 3, Pages 357-361

**Abstract:** An attempt to restore erased characters on an engine block using standard polishing and etching procedures was unsuccessful. The top layer of the surface was carefully removed by hand filing and the surface was repolished and re-etched. Successful restoration was then achieved.

## A Validation Study of Barefoot Morphology Comparison

**Author(s):** Maltais, L.; Yamashita, B.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 3, Pages 362-370

**Abstract:** Nine latent barefoot impressions, with ten accompanying inked impressions, were sent to fifteen barefoot morphology examiners for evaluation, for a total of 1350 comparisons. The examiners were asked to include or exclude suspects as having possibly created the latent impressions. Examiners were not asked to make positive identifications, so more than one inclusion in a set was possible and was not considered to be an error. On only one occasion was the correct inked impression excluded as being made by the same person who created the latent impression, with reservations requesting better standards. These results indicate that the methods used to compare barefoot morphology can be used reliably to include or exclude suspects.

## Standardizing Protocols for Fingerprint Reagent Testing

**Author(s):** Kent, T.

**Type:** Article

**Published:** 2010, Volume 60, Issue 3, Pages 371-379

**Abstract:** A move to standardizing protocols for fingerprint reagent testing would benefit both researchers and those responsible for implementing techniques operationally. Some possible sampling protocols and testing methods and procedures are outlined and discussed.

## Death Scene Investigation

**Author(s):** Thornton, J. I.

**Type:** Book Review

**Published:** 2010, Volume 60, Issue 3, Pages 380-381

## Soil Analysis in Forensic Taphonomy

**Author(s):** Thornton, J. I.

**Type:** Book Review

**Published:** 2010, Volume 60, Issue 3, Pages 382-385

## Back to Basics

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2010, Volume 60, Issue 3, Page 392

**Abstract:** This pattern has two equally good looping formations with one delta. It cannot be classified as a whorl since it would be difficult to choose one of the loops over the other. (FBI, Science of Fingerprints, pages 66-6). It is classified as a tented arch and then referenced as necessary. Arbitrary tented arches are rare. This is only the third I have seen in my 20 years of experience. This interesting and unusual pattern was sent in by Jim Betts and Natasha Ellington, Nebraska State Patrol AFIS. Thanks to both. (See correction in JFI 60 (4).)

## Coulier, Paul-Jean (1824–1890): A Precursor in the History of Fingermark Detection and Their Potential Use for Identifying Their Source (1863)

**Author(s):** Quinche, N.; Margot, P.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 2, Pages 129-134

**Abstract:** An online copy of a 1863 French book, The Scientific and Industrial Year (English translation of the title), that predates other historically significant writings about fingerprints suggests the use of iodine stains to reproduce papillary lines of the skin and suggests the feasibility of identifying suspects by touch. It also suggests the use of a magnifying glass for comparing those impressions whose origins need to be determined.

## Sexual Dimorphism in Deciduous and Permanent Teeth: Analysis of a Sample of Subadult Subjects with Mixed Dentition

**Author(s):** Santoro, V.; Donno, A.; Lozito, P.; Ciccarelli, E.; Marrone, G.; Introna, F.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 2, Pages 135-147

**Abstract:** In adult subjects, sex determination of skeletal remains is carried out by means of analysis, looking at the individualization for signs of sexual dimorphism present in the skull and the pelvis. The metric approach is often used in concert with the morphological approach, where assessments are based on size and distances between structures of the cranium. In subadult subjects, on the other hand, it is impossible to apply macroscopic diagnostic criteria based on specific areas like the cranium and pelvis because the specific secondary sexual characteristics are not yet fully expressed. Many studies have shown a positive correlation between the size of the permanent teeth and the sex of the subject. This is particularly evident in the canines and first permanent molars. The main objective of our study was to assess the dimorphic efficiency of odontometric parameters of mixed dentition through the analysis of 126 Caucasian children. The sample included subjects between 6 and 10 years old, each of whose dental and palate diameter measurements were taken using a digital caliper. A statistical analysis was carried out using the values obtained. In particular, the values obtained were analyzed by calculating the standard deviation, the P-value, and the logit model.

## Development of Latent Prints on Firearms Evidence

**Author(s):** Johnson, S.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 2, Pages 148-151

**Abstract:** Data were tallied from a single laboratory that indicated that useable latent prints were developed on approximately twelve percent of the firearms and magazines that were processed.

## A Significant Improvement to the SPR Process: More Latent Prints were Revealed after Thorough Wiping of Small Particle Reagent-Treated Surface

**Author(s):** Cohen, D.; Cohen, E.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 2, Pages 152-162

**Abstract:** Small particle reagent (SPR) is a well-known and scientifically sound reagent for developing fingerprints on dusty, oily, and wet surfaces [1]. After completing the traditional SPR process, additional fingermarks, which had not been visible at first, appeared after thoroughly wiping the SPR-treated area. This phenomenon was observed on a variety of nonporous surfaces such as the metallic exterior of cars, glass windows, and plastic shutters.

## Superimposition of Artifact on Bone in Unidentified Skeleton: Alleged Member of James-Younger Gang

**Author(s):** Bailey, J. A.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 2, Pages 163-172

**Abstract:** The Northfield Historical Society received a skeleton donated in 1981 alleged to belong to Charlie Pitts, a member of the James-Younger gang. In 2008, a superimposition was conducted using digital images of a sternal artifact on the skeleton believed by some to be a gunshot wound to the chest. The artifact aligned with a gunshot wound on a postmortem photograph of Charlie Pitts; however, the authenticity of the artifact was questioned. A bullet wipe test was also conducted and the results were negative.

## Bullet Path Directionality

**Author(s):** Kitchen, G.

**Type:** Case Report

**Published:** 2010, Volume 60, Issue 2, Pages 173-180

**Abstract:** A ricochet defect is investigated to determine the direction of impact on a painted metallic surface. The examination failed to locate pinch marks and boat wave fractures. Tests were conducted on a like surface to determine whether pinch marks and boat wave fractures do occur and should have been visible in the scene photographs. It was found that pinch marks did not occur on a like surface, but some subdued boat wave fractures were visible using close-up photography combined with reflective lighting. The author suggests that this may be the result of a difference in the metal surface, paint, and sealant formulations and needs to be considered in future case work.

## Reflected Ultraviolet Digital Photography: The Part Someone Forgot to Mention

**Author(s):** Sanfilippo, P.; Richards, A.; Nichols, H.

**Type:** Article

**Published:** 2010, Volume 60, Issue 2, Pages 181-198

**Abstract:** Reflected ultraviolet photography has been used to document evidence for many years. However, success was often limited because the reflected light was invisible to the eye and was difficult to focus on the film plane. This article presents a discussion about the difficulties of reflected ultraviolet photography and the use of digital reflected ultraviolet photography with cameras like the Fujifilm camera. The benefit of using a Baader Venus filter in lieu of other barrier filters is also explained. With a more thorough understanding of reflective ultraviolet photography, the forensic photographer should be able to produce better results.

## Methylamine Pretreatment of Dry Latent Fingermarks on Polyethylene for Enhanced Detection by Cyanoacrylate Fuming

**Author(s):** McLaren, C.; Lennard, C.; Stoilovic, M.

**Type:** Article

**Published:** 2010, Volume 60, Issue 2, Pages 199-222

**Abstract:** Cyanoacrylate fuming is an effective routine technique for the detection of latent fingermarks on nonporous surfaces. The fuming mechanism involves the formation of hard, white polycyanoacrylate along the fingermark ridges, resulting in the detection of latent fingermarks on treated evidential items. Because the

polymerization reaction is believed to be largely catalyzed by moisture, the inability to detect or develop some fingermarks is understandably attributed to dehydration of the deposit. Dehydration naturally occurs as the fingermark ages over time; such fingermarks are particularly problematic following exposure to harsh environmental conditions such as low humidity, ultraviolet light, or heat. Several pretreatment methods intended to reintroduce moisture to dehydrated fingermarks have been reported, including exposure to heated water vapor, acetic acid vapor, and ammonia vapor. If an effective method for reintroducing moisture to dry latent impressions can be developed and validated, then enhanced detection by cyanoacrylate fuming would result. This study was designed to investigate and compare published and novel strategies for pretreating dry latent fingermarks and to optimize the pretreatment application for polyethylene substrates. The most significant outcome was the enhanced cyanoacrylate response to dry latent fingermarks pretreated with vapor from 10% w/v aqueous methylamine solution. The results indicate that incorporation of an optimized pretreatment of this type into operational casework could potentially be the difference between unidentifiable fingermarks (lacking detail and contrast) versus fingermarks suitable for identification purposes.

## **Latent Print Training to Competency: Is it Time for a Universal Training Program?**

**Author(s):** Cooney, L.

**Type:** Article

**Published:** 2010, Volume 60, Issue 2, Pages 223-258

**Abstract:** With no standardized training program in the field of latent prints, agencies are left to design and implement their own training programs. At a time when industry standards are being challenged in courtrooms, this type of training methodology has come into question. The purpose of this study was to determine baseline current practices throughout the United States and to analyze whether these practices are consistent. A survey was conducted to determine the following: whether agencies do, in fact, have formal written training programs, whether these training programs adhere to SWGFAST training-to-competency guidelines as written, whether there is consensus as to how these guidelines are interpreted, and whether there is a difference in training standards between ASCLD/LAB accredited agencies and nonaccredited agencies. The data revealed that although most agencies have written training programs, there is very little consistency or adherence to published guidelines.

## **Succeeding as an Expert Witness**

**Author(s):** Davis, R.

**Type:** Book Review

**Published:** 2010, Volume 60, Issue 2, Pages 259-262

## **Back to Basics**

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2010, Volume 60, Issue 2, Page 268

**Abstract:** This print will be classified as an accidental whorl. There is one recurve in front of the center delta. It would be referenced to a plain whorl. Thank you to Alan Christensen with the King County SO, Washington. He noticed the flower in the center. It reminds me of Audrey from "The Little Shop of Horrors". [See JFI 60 (3) for correction].

## An Alternative Trinity: Objectivity, Subjectivity, and Transparency

**Author(s):** de Puit, M.

**Type:** Commentary

**Published:** 2010, Volume 60, Issue 1, Pages 1-3

## Using a Reflected Ultraviolet Imaging System to Recover Friction Ridge Impressions on Post-Blast Material

**Author(s):** Gardner, E.

**Type:** Article

**Published:** 2010, Volume 60, Issue 1, Pages 104-118

**Abstract:** As terrorist bombing incidents continue both domestically and internationally, the need to identify those responsible grows. Currently, the majority of post-blast forensics focuses on identifying the explosive materials used and their amount, determining the size of the blast radius, and identifying human remains. Latent prints are commonly located on tape and batteries. Less attention is focused on examining post-blast materials because of the assumption that the intense heat of the explosion would obliterate them. Research using reflective ultraviolet imaging systems (RUVIS) revealed the ability of latent print evidence to survive intense thermal conditions. A potential application of this technology includes a nonintrusive method of locating and capturing friction ridge impressions from devices and munitions, prior to on-site destruction.

## Bloodstain Pattern Analysis With an Introduction to Crime Scene Reconstruction

**Author(s):** Chisum, J.

**Type:** Book Review

**Published:** 2010, Volume 60, Issue 1, Pages 119-124

## Back to Basics

**Author(s):** Siegel, S. D.

**Type:** Back to Basics

**Published:** 2010, Volume 60, Issue 1, Page 128

**Abstract:** This is a good example of Syndactyly, the side-to-side fusion of two or more digits (also known as webbed fingers or toes). The pattern type commonly shows two complete patterns, sometimes separated by a split or furrow (Fingerprint Techniques, by Andre A. Moenssens, pg 39).

## The Efficacy of Commercial vs Noncommercial Physical Developer Solutions and the Sequential Enhancement of Friction Ridge Impressions Using Potassium Iodide

**Author(s):** Swofford, H. J.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 1, Pages 19-33

**Abstract:** The first section of this study aimed at determining the substrate type and deposition age in which latent impressions were developed with the highest level of quality. The second section of this study, using the

combination of the substrate type and deposition age that yielded the highest quality impressions from the results of section one, investigated the results of two physical developer solutions before and again after treatment of the samples with potassium iodide. The results of this study indicate that both the commercial and noncommercial physical developer solutions are competitive in their developmental quality; however, the redox mixture from the commercial physical developer solution has a greater opacity than the redox mixture from the noncommercial physical developer solution. Consequently, the efficacy of potassium iodide as a potential enhancement technique is diminished when using the redox solution from the commercial physical developer solution.

## **Latent Fingerprint Detection on Thermal Paper using Vacuum Metal Deposition and Steam**

**Author(s):** Kusenthiran, S.; Rogers, T.; Knaap, W.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 1, Pages 34-44

**Abstract:** The purpose of this study was to investigate the effectiveness of vacuum metal deposition (VMD) and steam for developing latent fingerprints on thermal paper. The results indicate that the use of either VMD or steam allows for visualization of latent fingerprints, even for fingerprint deposits that are three weeks old. The study also showed that discoloration of thermal paper was not a problem in either technique.

## **The Quantification of Tooth Displacement**

**Author(s):** Radmer, T. W.; Johnson, L. T.; Yang, M.; Wirtz, T.

**Type:** Technical Note

**Published:** 2010, Volume 60, Issue 1, Pages 4-18

**Abstract:** By using reference points from a single pixel marker placed at the center point of the cuspid teeth and the center point on each of the incisor teeth, a polynomial curve was generated as a native curve for each dental arch studied. The polynomial curve generated from actual tooth position in each arch provides the forensic odontologist with another reference point that is quantifiable. The study represents that individual characteristics, such as tooth displacement, can be quantified in a simple, reliable, and repeatable format.

## **Chemical Enhancement of Bloody Footwear Impressions from Buried Substrates**

**Author(s):** Cullen, S.; Otto, A.; Cheetham, P.

**Type:** Article

**Published:** 2010, Volume 60, Issue 1, Pages 45-86

**Abstract:** Footwear impressions are regarded as one of the most common forensic evidence types left at crime scenes. A review of research to date describes previous tests on the survival of footwear impressions in a range of contaminants on a myriad of surfaces. None, however, examined the effects of the burial environment on such impressions. Using human blood as a contaminant, footwear impressions were made on samples of white cotton, newspaper, and black plastic trash bags and were buried for specific time frames, from one to four weeks. The study examines the subsequent development of the surviving impressions postexcavation, using chemical enhancement techniques of ninhydrin, acid black 1, leucocrystal violet (LCV), and Bluestar. The majority of impressions recovered were from the substrates that were in the soil for the shortest period. Poor recovery rates and loss of impressions were observed on substrates buried for more than two weeks. LCV and Bluestar proved most effective for enhancing and retrieving impressions. Impressions were able to be examined by a trained forensic footwear investigator to identify class, individual, and wear characteristics of the impression itself. Potential survival of such identifying features is of paramount importance to an investigation.

## ACE-V and the Scientific Method

**Author(s):** Reznicek, M.; Ruth, R.; Schilens, D.

**Type:** Article

**Published:** 2010, Volume 60, Issue 1, Pages 87-103

**Abstract:** The scientific method is a general approach for all hypothesis testing. Analysis, comparison, evaluation, and verification (ACE-V) is a scientific methodology that is part of the scientific method. Several publications have attempted to explain ACE-V as a scientific method or its role within the scientific method, but these attempts are either not comprehensive or not explicit. This article expands on these previous works and outlines the scientific method as a seven-step process. The scientific method is discussed using the premises of uniqueness, persistence, and classifiability. Each step of the scientific method is addressed specifically as it applies to friction ridge impression examination in casework. It is important for examiners to understand and apply the scientific method, including ACE-V, and be able to articulate this method.