Information Bulletin for Shoeprint/Toolmark Examiners

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Vol. 7, No. 1, January 2001

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FOREWORD

Dear readers,

The editor of the Information Bulletin for Shoeprint /Toolmark Examiners has been changed. As a new editor I want to thank Heikki Majamaa for the work he has done with the Bulletin during all these years. The Bulletin will still be published by National Bureau of Investigation, Crime Laboratory, Finland as it has been published already six years. Gerrit Volckeryck, Gerechtelijke Politie, Belgium has promised to help me as a co-editor of the Bulletin. The content of the IBSTE is naturally depending greatly on you -our readers - and your activity to send articles, cases etc. to be published in this Bulletin.
I will appreciate all efforts to help make the IBSTE worthy of reading also in the future.

The scale committee of Working Group Marks had a meeting in Brussels late in November. The main topic being discussed there was the basis of harmonized scale. Should it be based on Bayesian approach or should it be based on probabilities as the scales in use currently are based in many countries. The discussions will continue in the 4th SPTM Meeting in Berlin. I hope we can publish the Minutes of the scale committee Meeting in the next Bulletin.

Since many of the members of the scale committee are also members of the MWG Board, a short Board Meeting was also arranged in Brussels. In the Board Meeting the possibility to make this IBSTE in the future only as an internet version was discussed briefly. One advantage of an internet version would be that it will save time and the amount of work of the editor. The main advantage with the internet version could anyway be better quality of the IBSTE - we could use colours, coloured photographs, all kind of graphics etc. to highlight certain things in case reports and in different articles. The disadvantage of the internet version is that there possibly exists quite a big group of readers who don't have internet connection easily in use. Possible changing to an internet version of the IBSTE will be one of the items we have to talk about in our 4th Meeting in Berlin. I also hope to get emails or letters from you already before the Meeting - what do you think about such an idea.

In the 4th SPTM Meeting in Berlin you will have a situation offered to take the theoretical part in the IAI Footwear Certification test. The examiners interested in taking part in the test should contact Sandy Wiersema as soon as possible to get more information. You will find her address in this Bulletin on page 15.

The Second European Academy of Forensic Science Meeting was held in Cracow, Poland, in September 12-16, 2000. On behalf of Mark examiners I want to thank all the organizers of a very well arranged conference. A short description of the Meeting and some interesting abstracts are also included in this Bulletin.

Shoeprint and Toolmark Examiners have had three very successful and very necessary Meetings until this - in Finland 1995, in the Netherlands 1997 and in Sweden 1999. Based on the preliminary program we can expect to have a very good conference also in Berlin. We all are looking forward the 4th Meeting.

I want to wish a very successful year ahead to everyone.

Sincerely,
Anja Ytti

EUROPEAN MEETING FOR SHOEPRINT/TOOLMARK EXAMINERS (SPTM 2001)

of the ENFSI (Marks Working Group)

May 15 – 18, 2001
Berlin, Germany

Landeskriminalamt Berlin

Hosted by

Institut Polizeitechnische Untersuchungen – Landeskriminalamt Berlin

and

Kriminaltechnisches Institut - Bundeskriminalamt Wiesbaden

Introduction

The Institut Polizeitechnische Untersuchungen of the Landeskriminalamt in Berlin and the Kriminaltechnisches Institut of the Bundeskriminalamt in Wiesbaden will host and arrange the fourth International Meeting for Shoeprint and Toolmark Examiners (SPTM 2001). This meeting is scheduled to take place in Berlin, Germany, May, 15-18, 2001.

The purpose of the meeting is to continue to bring together individual SP/TM examiners from crime laboratories in Europe, also participants from the rest of the world are welcome.

The examiners will have the opportunity to participate in a program based on our mutual interest in the examination of marks. We will try to present an interesting and stimulating program, and to promote discussions in various fields of expertise between our colleagues. In this way we hope to provide an excellent opportunity to exchange knowledge and experience.

Conference program (draft)

Tuesday May 15, 2001

		topics
08.30-	11.00	Registration
11.00-	11.20	Word of welcome, Marks Working Group, Organizing Committee
11.20-		**Workshop:** Events, probabilities, Bayes rules, Bayesian approach and conclusion scales, including an **International panel:** reporting conventions
	17.00	**Presentations:** Physical examinations of castings, investigation of manufacturing marks on newspapers, mark examinations and marks in general

Wednesday May 16, 2001

		topics
08.30-	12.00	**Presentations:** Computerized comparison of toolmarks, digitalization of toolmark patterns, ...
13.00-	14.00	Bus transfer to Fraunhofer Institute
14.00-	14.15	Introduction to Fraunhofer Institute
14.15-	17.00	**Presentation of PAMIR** (Pattern based Toolmark Identification and Recognition)

Thursday May 17, 2001

		topics
08.30-	17.00	**Presentations:** Certification IAI, lock and key examinations, shoeprint and barefoot examinations

Friday May 18, 2001

		topics
09.00-	12.00	**Presentations:** Plastic bags examinations, restoration of erased numbers, jewellery and dies, mark examinations and marks in general

Oral contributions or posters are very welcome in relation to the topics of the program as well as other fields of mark examination and marks in general (toolmarks, shoesole and tire prints, restoration of erased numbers)

A commercial exhibition is also planned to take place during the meeting.

More information about the program will be available after the deadline for the Call for Papers, February 15, 2001.

Participation fee

The participation fee amounts to 250 DM. The fee covers conference program and social programme.

How to pay the registration fee:

- by credit transfer to
  Astron-Hotel Berlin/Potsdam
  Dresdner Bank Teltow, bank account: 49 715 150 00, bank code number: 160 800 00

or

- by an international check, which should be made payable to the Astron-Hotel Berlin/Potsdam.

Please pay the participation fee and send the registration form to the Astron-Hotel Berlin/Potsdam before March 15, 2001.

Cancellation

The participation fee will be refunded if cancellation is received at the latest by March 15. After this date there will be no reimbursement.

Call for papers

We particularly welcome papers that relate to the special topics mentioned. If you wish to present a paper, please fill in the enclosed form and return it not later than February 15, 2001. Confirmation of acceptance of paper will be sent at the latest by March 15, 2001. The choice and length of presentation will be subject to approval of the organizing committee.

Final announcement

A final announcement with further information is scheduled to the end of March 2001.

Accommodation

Pre-reservations have been made at the Astron Hotel Berlin/Potsdam in Kleinmachnow. If this is acceptable, please mark the „Registration Form“ appropriately and we will confirm your reservation to the hotel.

The price for accommodation is

- 208 DM in a single room per night (including breakfast and lunch)
- 153 DM in a double room per night (including breakfast and lunch)

Payments for the accommodation must be made by the delegates directly to the hotel when checking out.

Further Information

In case you need further information, please contact:

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fax: +49 33203 49 900
e-mail: Berlin@astron-hotels.de

European Meeting for Shoeprint/Toolmark Examiners (SPTM 2001)

CALL FOR PAPERS

Please complete the form in block letters

Title of paper.....

Author(s).....

Presenting author(s).....

Organization.....

Address.....

Country.....

Phone..... Fax.....

E-Mail.....

Presentation choice

Talking paper ☐ Time required: ..... minutes

Poster ☐

Audio-visual requirements

Available equipment is slide projector, over-head projector and video/computer projector: If you have other requirements, please inform us.

Abstracts

To have the best possible information about the program, we would need to have your abstract(s). The abstract(s) should be typed and submitted in the following format: Title, name of author and addresses, as you wish them to appear. Single spaced, Times 12 point type size. Maximum length one-half page. If possible, enclose to the paper a 3,5 inch computer disc using preferable Microsoft Word for Windows.

Poster presentation

Each author will have access to a board of 140 x 140 cm to display material.

Date: _____

Signature: _____

Please send this form no later than February 15, 2001 to:

Der Polizeipräsident in Berlin
Institut Polizeitechnische Untersuchungen
Att: Torsten Ahlhorn
Tempelhofer Damm 12
12101 Berlin
Germany

European Meeting for Shoeprint/Toolmark Examiners (SPTM 2001)

REGISTRATION FORM

Please complete the form in block letters

Participant (participation fee: 250,- DM)

Surname.....

First name.....

Organisation.....

Address.....

.....

Country.....

Phone.....

Fax.....

E-Mail.....

Accompanying person (fee: 190,- DM)

Surname.....

First name.....

Reservation at the Astron Hotel Berlin/Potsdam

Single room ☐ Double room ☐

Date of arrival..... Date of departure.....

Date: _____ Signature:
_____

Please send this form no later than March 15, 2001 to:

ASTRON Hotel Berlin/Potsdam
Att: Yvonne Katz
Zehlendorfer Damm 190
14532 Kleinmachnow
Germany

IAI FOOTWEAR CERTIFICATION

This is important to all of you who are interested in participating the IAI (International Association for Identification) Footwear Certification Test in the 4th SPTM Meeting in Berlin. The possibility to take the theoretical part of the test will be offered during the Meeting. The practical part you can do after passing the theoretical part. The test will take two-three hours.

You can get the application forms and all the information needed from Sandra Wiersema, FBI. Also if you have questions about the IAI Certification test you should contact Sandra Wiersema. The cost for the Test is 100 USD and it should be paid before taking the test. You can pay the cost of the Test preferably beforehand with an international check along with the application form or at the latest in the Meeting before the Test.

Please contact,

Sandra Wiersema
Federal Bureau of Investigation
935 Pennsylvania Ave., NW
Washington, DC 20535
Phone: 202-324-4492
Fax: 202-324-1094
email: swiersem@leo.gov

MWG STATUTE

NOTE ***

John Birkett, FSS, a member of the Board of the Working Group Marks will send a letter to all the ENFSI Institutes in Europe. The letter will include the draft Statute for the ENFSI Working Group Marks. Your replies should be sent back to John Birkett.

WHO ME...BIASED? OR "WE HAVE MET THE ENEMY, AND HE IS US!"

William C. Smith

Reprint from AFTE Journal (Volume 25, Number 4, October 1993). Permission for reprinting received from the editor of AFTE Journal.

bias: n. A preference or inclination, esp. one that inhibits impartial judgement: an uninformed or unintentional inclination

What criminalist, latent print analyst, questioned document examiner, or toxicologist would admit to having a bias in his approach to casework? A rhetorical question, for sure, but one which should call us to ponder and search our own individual mind sets before we approach any type of forensic examination. Bias exists to some extent in all of us. It is certainly present in forensic science. Many of us have seen this first hand, in those people we dub as "charlatan defense experts", or "hired guns" that the "other" side brings in for only one reason...to "muddy up the waters". But how many of us have looked back in the other direction? How many have asked the question, "Where could my thought process be flawed? Am I beginning with any preconceived expectations that could color my outlook or bias my observations?" Introspection of this sort is not easy, especially when it seems to call into question one of the most critical aspects of our professional life...our credibility. But hopefully that same desire and respect for our own credibility will allow us to overcome any hesitancy to look within ourselves. Some questions for reflection:

- Does the fact we work for one side (prosecution) have an effect on our analysis?
- Does the fact police agencies are considered our "client's" have an effect on our analysis?
- Does the fact suspects have already been arrested in this case have an effect on our analysis?
- Do eyewitness statements or investigative theory have an effect on our analysis?
- Does the fact we have done repeated analysis on the same type of item have an effect on our results?
- Do any of our previously drawn conclusions have an effect on present or future analysis that might be done in this case?

The obvious quick answer to all of these questions is "of course not!" After all, as forensic scientists we pride ourselves in the ability to work free of any outside pressure that might be placed upon us to have our results turn out a specific way or conform to a certain investigative theory. But let's take another look. What about the less obvious pressures and expectations that unconsciously may be working on us.

- Where are the compliments coming from? Those letters of accommodation and thanks that come from our clients (police and DA) regarding our testimony after a successful conviction - certainly an ago booster, and good for our bosses to see. We even publish them in our DE update for everyone to read. Could this have any subconscious effect on us?

- How much pressure is being put on us to come up with a positive result? Are we, our supervisors, the laboratory, or the Bureau keeping count? Are inconclusive results rewarded as much as positive results? Are the number of identifications we make important? Could this have any subconscious effect on us?

- How about those hard-working detectives we've known for years? The real good ones, who have been working hard to solve a major crime. They finally have the break they may need, and now it's in our lap to try to connect the suspect up with the scene. We're in phone contact everyday with them, discussing the case, and trying to work with them to finally make that one piece of evidence they need to make the arrest. Could this have any subconscious effect on us?

- What about the case where the suspect is already under arrest? There is a lot of evidence besides our analysis that links him to the crime. In fact the case may be able to be prosecuted just on eyewitnesses alone. The prosecutor would like some physical evidence to show the jury. It's our job to corroborate the prosecution case. Do we have any preconceived expectations on the outcome and what kind of subconscious effect does this place on us?

- How about those analyses that "always" come out a certain way? What is my mind set looking at the 50th case involving plant material, when the previous 49 have already turned out positive for marihuana? Or the GCMS chart on PCP when every other positive RIA sample for the past two months has been confirmed? Or the tenth latent print in a case, where we've already made the suspect on the previous nine latents? Do we have any preconceived expectations on the outcome and what kind of subconscious effect does this place on us?

Hopefully this second look will allow us to see where at least the possibility of subconscious bias may come into play. We need to treat this kind of bias much like any other error we may detect. Bias in and of itself does not signify the death knell of our objectivity or credibility. We need to develop approaches to our casework which take into account the possibility of any built-in bias we may have, however subconscious it may be. I have grave concerns for those of us who refuse to admit this as a very real part of our human nature both as an individual and a forensic scientist. Recognizing bias, and in so far as much of it comes from a subconscious level, this needs to take the form of a disciplined approach to our case work. Over the years of both working in the field and in the crime laboratory administration, I have come up with a series of simple questions which have helped me counteract the effects of a predetermined mind set of subconscious bias.

Question 1; Have I tried to prove the opposite?

As forensic scientists, one of the easiest and surest ways we have of countering any built-in bias is to ask ourselves the question "Have I looked at the evidence with an eye towards proving the opposite of what is expected?" In simple terms, have I looked at the submitted bindle and tried to show that it isn't the drug suspected or the blood stain to show it didn't come from the suspect. What are the elements in the questioned writing that would tend to indicate that it isn't the suspect, or what are the factors in the hair or fiber evidence that could indicate a different source. At first blush, one may say they always do this. I tend to think not. We may give lip service to saying this, but it takes a real conscious and mental effort to turn the tables around, and honestly take a fresh look at the evidence with an eye toward disproving the investigative theory we have been working with. If I can honestly answer "yes" to this question and my initial conclusion still stands then I have gone a long way towards eliminating any predetermined set I may have begun with.

Question 2: Have I worked as hard to find dissimilarities as similarities?

A rather obvious question is being addressed here. Have I based my opinion on all the evidence? Or have I only looked for certain similarities and then stopped? Have I ignored the rest of the evidence? It is important to realize that any conclusion should also be based on the lack of unexplainable dissimilarities. If dissimilarities are found, then this should be the first indication I need to question my original conclusion. Doing this allows me to be open to the possibility that some of the original similarities may be in question. This should be a cardinal rule in approaching any comparative type of work, including fingerprints, firearms, toolmarks, shoe and tire impressions. For example, while 8 points of comparison in a fingerprint may signify an identification, one always needs to look for unexplainable dissimilarities and if found the question the original 8 points.

Question 3: Have I made notes of my observations and not just conclusions?

One of the first places to make an evaluation on objectivity is to look at the notes I have made. Are my notes based on my observations or are they primarily conclusions I have drawn? One might ask the question, "How does this provide any information regarding bias? Aren't notes solely for review purposes and for the refreshing of memory for later testimony on conclusions reached?" Note taking is certainly vital for these purposes, but it also provides some good information and clues as to my mind set when performing an analysis. If my mind is programmed to jump beyond the observation stage to reach immediate conclusions, then I need to question whether room has been left for objectivity. A simple example of this can be seen in the notes someone makes after performing a Duquenois test on a suspected marihuana sample. Do the notes reflect observations made on the test

(i.e. bluish-purple color) or do they show the immediate jumping to a conclusion (i.e. +, or +mj). As simple as that example is, it tells something very significant about the existence of a predetermined mind set. Objective test results have become less important than conclusions. The analyst without even realizing it has programmed himself to identify plant material as marijuana and subconsciously skips the all important first step of critically evaluating the test result.

Question 4: Can I demonstrate my findings to others?

Are my results capable of being shown to others? Have I recorded and/or photographed my observations? Can my work be duplicated by other forensic scientists? Would other qualified experts get the same test results or be able to observe what I observed? If my answer is no to any of the above, then I need to do some serious introspection and ask myself the question, "Why?" what is it that makes my observations/results not readily apparent to others? Am I reading something into my results that may not be present? An example of this would be the serologist who runs a PGM plate and believes she might be able to faintly see a 2-band on a sample. Other serologists looking at the plate don't believe this band is visible. This should raise some immediate concerns about whether the first serologist is reading more into this run than is present. Likewise with everything I do, if my work is not easily demonstrable to others, then I need to step back and make another evaluation of my objectivity. We need to remember this isn't just a question of numbers or going with the consensus. Even if more analysts agree with me than not, I still need to do some re-evaluation. No matter whether it is a difference of opinion over the presence of an electrophoresis band or a point in a latent print, a signal has been sent to me I should not ignore or pass off. An inconclusive rather than definite finding may be far more appropriate in these situations.

Question 5: Do the elements in the questioned material stand on their own?

When performing any type of comparative analysis, one must be aware of reading more into the questioned material than is actually present. There is a plethora of tests and experiments one can apply to demonstrate the fact the mind can be subconsciously swayed into viewing things in a particular way. This becomes very especially important when a side by side comparison is being made between questioned and known samples. The question I need to ask myself when performing these type of analysis is, "What effect does picturing the known have on my ability to accurately perceive what is truly present in the unknown?" Fortunately this can be readily determined: All I need to do is take the known away and ask myself, "Can I still see the point(s) I am using to make my comparison?" If I think the answer is "yes", then this can be easily tested by having another analyst look at the questioned without the benefit of the known. If the point(s) are obvious to this

analyst who hasn't made the benefit of seeing the known, then affirmation was obtained as the questioned sample was able to stand on its own. If on the other hand, points of comparison on the questioned cannot be determined without having the benefit of first seeing where they should be by looking at the known, then one has to seriously question the objectivity of the analysis.

Question 6: Have I obtained an independent verification of my results?

Has someone else looked at my results and given me an independent opinion? Much of our work can be easily confirmed by another analyst. This in essence allows us to see things through a second set of eyes and provides the opportunity for another viewpoint. It is important to try to make the second opinion as independent and free from suggestion as possible. If all the second examiner does is look through a comparison microscope for a few minutes to verify a bullet comparison that took originally several days of work to arrive at, one has to question the degree of reliance to be put on that second opinion, especially if it agrees with the first analysis. In fact, rather than provide good verification, what in all probability happens is the imparting of a false sense of security. The first examiner believes his opinion is now bolstered by the second analyst, while the second analyst thinks he only needed to give it a "quick-look-see" as the first one did all the work and already arrived at his conclusion. Whether I am doing a bullet, fingerprint, fiber of blood group comparison, it is important any second opinion be as independent of my conclusions as possible. Blind reads of electrophoresis plates or an independent recording of points of similarities in firearms and fingerprints serve this purpose well. Asking a second examiner to only verify the same set of facts I have already predetermined does not provide the best type of independent analysis.

These questions provide a basis by which I can check my own degree of bias in any particular case. The questions are not meant to be restrictive or weighty in their application, but provide a way to do a personal inventory of myself...a "gut check", if you will. There has been much recent discussion on how to set up effective quality assurance and quality control plans for our laboratories. A good deal of effort has gone into integrating proficiency samples on a regular basis. But beneath all of that, each individual needs to develop a casework ethic which frees him from those elements which may impact on his objectivity.

Thirty years ago, while a student at UC Berkeley, I attended my first CAC (Californian Association of Criminalists) meeting. I was excited to finally be able to meet some of the top people in the field. Bradford, Brackett, Cadman, Pinker, Longhetti, Davis, and Kirk were all in attendance. What dumfounded me was that most of the meeting was taken up in defining the word "Criminalistics". I couldn't understand how people who had been practising in the field for as long as they had were still hammering out some of the basics. Over the years I've come to appreciate more and more the wisdom of that

meeting. We need to keep discussing and defining those important elements of what make up our forensic science discipline. So for those of you who have heard this all before, please don't stop talking about it; and for those of you who have never looked at it this way before, please join with us in looking at ways to provide the most objective and unbiased forensic examinations possible.

THE SECOND EUROPEAN ACADEMY OF FORENSIC SCIENCE MEETING

Cracow , September 12-16, 2000

The Second European Academy of Forensic Science Meeting was arranged in Cracow in 12 - 16 of September 2000. The number of participants in the conference was over 600 so it was really a big conference. All the arrangements for the daily programmes, scientific sessions and social programmes in the evenings were great and Cracow really offered a unique and charming atmosphere for the conference. Special thanks to Andrzej Chochol who was a member of the organizing committee of the conference. He was very friendly and helpful host for the members of the Working Group Marks along his many other duties during the conference.

In the centre of Cracow is the Market Square with many beautiful old buildings, restaurants and cafes. The Royal Castle Wavel and the many museums of Cracow are only some minutes walking distance from the Market Square. The Get Together Party took place in the National Gallery which is situated on the Market Square and the Welcoming Party was arranged in the National Museum. Both museums offered collections of art - specially the old paintings were very impressive. For the Banquet many buses had been arranged to pick up the participants to the old Royal Castle in Niepolomice, 20 km South-East of Cracow.

For Shoeprint and Toolmark Examiners the "own" SPTM Meetings seem to be the most interesting ones and maybe that was one reason for not so many examiners participating in this ENFSI conference. There were anyway representatives from Austria, Estonia, Finland, Germany, the Netherlands, Poland, Spain, Sweden, Switzerland, United Kingdom and USA.

In the Business Meeting there were around 30-40 participants listening to Ian W. Evett, Christophe Champod and Graham Jackson from Forensic Science Service, London. They presented the principles of the Bayesian approach as the basis for drawing conclusions. There still are many open questions concerning the Bayesian approach and specially about the mathematics related to it. This topic is quite new within shoeprint discipline and it takes some time to get familiar with the ideas of Bayesian theorem compared to those of probability. I hope the examiners going to attend the SPTM Meeting in Berlin will try to find detailed information about the Bayesian approach to be prepared for the discussions of this topic in Berlin. There will be arranged an international panel discussion about "Reporting conclusions".

Some abstracts of the presentations in the Cracow Meeting are also introduced. Some of them were presented in the scientific session for Marks but there are also presentations of other disciplines like Quality Assurance.

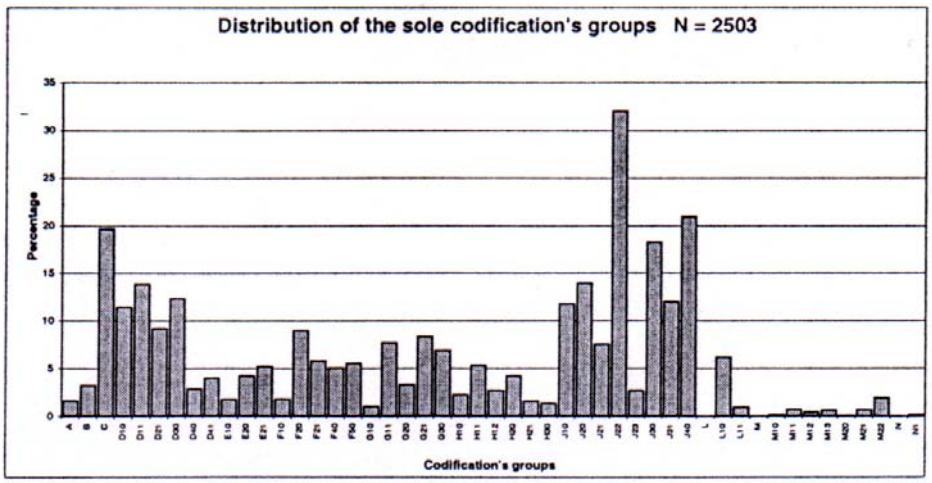
PERTINENCE OF THE CODIFICATION IN SHOEPRINTS' DATABASES

Alexandre GIROD
Identite Judiciaire, Police Cantonale Vaud, Lausanne-Dorigny, Switzerland

In the matter of shoe soles, the variety of designs makes an efficient group classification difficult to realize.
The principal aim of a data processing is to create an effective and coherent classification of different shoe outsole's designs. The codification of a sole in three parts: the sole, the instep and the heel improves significantly the databases efficiency. Nevertheless, the effectiveness of a classification depends on the discriminating power of the different groups.
The aim of this research is to control the pertinence of our codification and the discriminating power of our groups. The results show that:

- some groups are not pertinent,
- all our groups do not have a good discriminating power,
- the codification's distribution is not the same under the sole, the instep and the heel,
- each brand uses geometric forms differently.

For example, the following graph shows the soles codification's distribution for 2503 pairs of shoes with different designs. A good discriminating power is minus 10%. In our classification, 10 groups are not really pertinent. Particularly, the rectangles group (J22) present in 32% of soles' codification.



Key words: Shoeprints, Database, Codification, Pertinence, Discriminating power.

THE ANALYSIS OF SERIAL CRIME THROUGH THE USE OF DIFFERENT SOURCES OF DATA

Olivier RIBAUX and *Pierre MARGOT*
Institut de Police Scientifique et de Criminologie, Universite de Lausanne, Lausanne-Dorigny, Switzerland

The analysis of serial crime is based on a broad variety of data coming from different sources; for instance, solutions can be found through the use of spatio-temporal reasoning processes, inferences that use forensic science data, as well as the evaluation of modus operandi.
Practical situations will be presented that describe different forms of analysis and explain how the different pieces of information can be combined in a coherent reasoning process. Those examples do justify the existence of different notions or concepts such as phenomenon, profile, series, case and different types of links, etc and how these can be modelled as components within a structured memory.
This conceptual model has been exploited to design and create a prototype of a computerised system that provides adequate support for the analysis of serial burglaries.

Key words: Burglary, Intelligence, Memory, Reasoning, Computing.

PRINCIPLES OF EVIDENCE INTERPRETATION

Ian W EVETT, Graham JACKSON, *Stella McCROSSAN*, *and Christophe CHAMPOD*
Forensic Science Service, London, United Kingdom

The interpretation of evidence is the core of forensic science. It is essentially a process of reasoning in the face of uncertainty. If we agree that our profession is scientific then it follows that interpretation must take place within a logical framework. Over the last 30 years there has been a rapid evolution in thinking about this subject and a framework now exists that provides a foundation for interpreting all kinds of forensic science evidence. These ideas have been taken forward over the last three years within the FSS by means of the Case Assessment and Interpretation (CAI) project and this is having a major influence on our approach to casework. The framework can be seen to rest on three simple principles. These will be explained and illustrated by typical casework examples.

Keywords: Evidence interpretation, Likelihood ratio, Bayesian approach.

INTERPRETATION OF THE VALUE OF EVIDENCE

Colin G. G. AITKEN
Department of Mathematics and Statistics, The University of Edinburgh, Edinburgh, United Kingdom

It has been argued for some time that the best way to evaluate evidence is to compare two probabilities, the probability of the evidence if the prosecution hypothesis is true and the probability of the evidence if the defence hypothesis is true. How these probabilities are used to evaluate evidence will be explained. Various methods which have been used to interpret evidence will be illustrated and their correctness or otherwise discussed.

Key words: Evidence interpretation, Probability of evidence.

REPORTING CONVENTIONS

Ian W. EVETT, *Christophe CHAMPOD*, *Graham JACKSON*, *and John BIRKETT*
Forensic Science Service, London, United Kingdom

An effective reporting convention must satisfy certain basic requirements. One is that it should, as far as possible, unify practices across all evidence types - it is unthinkable, for example, that one should have one convention for toolmarks and another for glass evidence. Another requirement is that the convention should be founded on scientific principles. Much of forensic science involves reasoning in the face of uncertainty and this inevitably invokes the notion of probability. Thus probability theory provides the logical basis for reasoning and this informs the structure and wording of the reporting convention.

Key words: Footwear marks, Verbal scale, Evidence interpretation, Likelihood ratio, Bayesian approach.

BAYESIAN NETWORKS AND THE ASSESSMENT OF SCIENTIFIC EVIDENCE

Franco TARONI [1,2] and Paolo GARBOLINO (presented by Pierre Margot)
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Lausanne-Dorigny, Switzerland
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Recently, methods that deal with formal analysis of decision making have been developed. Bayesian networks - also known as belief networks and causal probabilistic networks - provide a method of representing relationships between characteristics even if the relationships involve uncertainty, unpredictability or imprecision. This quantitative method assists the expert not only in describing a problem and communicating information about its structure but also in

calculating the effect of the truth of one proposition or piece of evidence on the plausibility of others. Notably, Bayesian networks are a network-based framework for representing and analysing situations involving uncertainty (i.e. evidence evaluation, criminal investigation, etc.).

Information is presented in a graph as a set of nodes (representing the variables) linked by directed arcs (or edges) and the direction of the arc represents an influential relationship. The absence of an arc between two nodes implies that the two variables associated with these nodes are independent of each other, conditional on knowledge of the values of the other variables.

Bayesian decision theory could be a useful tool for forensic scientists essentially because human fail to follows a logical framework in complex situations.
Practically, Bayes networks allow the forensic scientist to:

- learn a way of thinking about the problem involving uncertain information;
- learn how to apply these methods to draw inferences about the field of interest;
- learn how to act rationally under uncertainty.

The aim of this paper is to show how such a methodology could facilitate the evaluation of the scientific evidence, notably to reach a likelihood ratio formula in different scenarios involving transfer evidence and to clarify the role of different variables.

Key words: Causal probability, Evidence interpretation, Relationships.

THE EXAMINATION OF MARKS MADE BY FOOTWEAR UPPERS ON CLOTHING

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Three cases were submitted for examination where it was alleged that kicking had occurred. However marks on the clothing were fragmentary and appeared to have been made by uppers, rather than soles, of footwear and to be made by the transfer of polish.
A range of polishes was purchased from stores in the UK, other European countries and the USA. It was found that there were different types of polishes; sponge-on, creams and waxes and that the major distinguishing feature was the waxes used in the different types. The characteristics of the different types were very similar, independent of country or brand. However detailed differences were noted in the types of waxes used, particularly for the hard wax polishes. These differences were sufficient to differentiate between most brands and product lines within brands. They showed no noticeable batch to batch variation.
The composition of the marks when exposed to the environment over a period of time was investigated, as was the force necessary for the transfer of polish to clothing. Changes when exposed to weather were slight and did not prevent the classification by type or brand. Investigation of the force necessary for transfer was found to be a complex issue but the indications are that little force is required.

Key words: Footwear marks, Polish, Clothing.

SCHALLAMACH PATTERN IN SHOEMARK IDENTIFICATION

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The simple fact of walking will induce an erosion phenomenon on the walker's shoes. Those abrasions can be of various forms and models. The model that was of interest to the authors of this paper was the Schallamach model. The abrasions look like fine waves, more or less parallel to each other and appear on the flat surface of a shoe sole.
This study was able to establish several factors influencing the appearance of those fine waves. Some of these factors are: time, manufacturing material of the shoe sole, type of ground, and other characteristics directly related to the person wearing the shoes (weight, gait).
Some other results show that the direction of the waves can change depending on where they are situated on the sole. Finally, it was also found that the morphological aspect of the waves will change according to time: first they are fine and tight, then they become wide and spaced apart, and then they become fine again.
These patterns have been used elsewhere for identification and this will be discussed in view of our results.

Key words: Wear, Shoemarks, Abrasions.

A STATISTICAL APPROACH OF AIR BUBBLES ON POLYURETHANE SHOESOLES

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Comparisons of a shoemark with a shoesole or standards sometimes lead to associations based on air bubbles among other manufacturing or acquired characteristics. Today, the assessment of the evidential value of air bubbles coincidences relies largely upon the examiner's experience and follows sometimes a verification based on the examination of a small number of analogous pairs collected for the case at hand.
Statistical data related to the occurrence and characteristics of air bubbles on shoesoles in an attempt to model the potential variability have been gathered.

Seventy-one pairs of shoes with the same design, brand, model and size were obtained. Right and left soles were photographed. An imageprocessing algorithm was developed to allow the systematic acquisition of data such as:

- the number of air bubbles on the sole and around given structural elements;
- the measure of air bubbles characteristics such as their surface and position.

These data allow a discussion of the assessment of the probability of finding on shoesoles (same design, brand, model and size) a certain nurnber of air bubbles on a surface with the same positions and morphology.
This presentation is the continuation of a previous work which studied only one of three regions of interest for each shoesole.

Key words: Evidential value, Evidence interpretation, Acquired characteristics.

BEST PRACTICE MANUALS

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The Quality Assurance Working Group was requested by ENFSI to develop a common format and provide guidance for the production of ENFSI Best Practice Manuals.

This presentation will describe the recommended format and how it should be applied by the ENFSI Working Groups.

It will also refer to the Fibres Working Group's Best Practice Manual as an example of how the guidance has been interpreted.

Key words: Best practice, Quality assurance, ENFSI guidelines, Fibres.

TOWARDS COMMON STANDARDS OF COMPETENCE FOR THE EUROPEAN FORENSIC SCIENTIST

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It is crucial for the health of forensic science that users of the services provided by forensic scientists can have complete confidence in the individual scientists involved.
Most laboratories will have schemes, often linked to training, which are designed to satisfy laboratory managers that their scientists are competent.
The focus on competence in forensic science in the United Kingdom has moved from the simple provision of training to defining national standards against which competence can be assessed.
This paper outlines how such standards developed, explores the processes involved and considers the possibility of pan-European standards of competence for forensic scientists.

Key words: Competence standards, Assessment.

QUALITY ASSURANCE IN SUBJECTIVE AREAS

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From a Quality Assurance point of view, in the field of forensic science we can distinguish between objective and subjective tests.
In some areas like handwriting, latent prints, shoe prints and toolmarks, hairs comparison, bloodstains analysis, voice analysis and arson investigation, it is quite difficult to demonstrate that the test is under control, i.e. that all the appropriately trained staff will obtain the same results within defined limits (probability or numerical values). So, what kind of quality tools does a forensic science laboratory have available to help minimise subjectivity on the part of the analyst and justify his opinion?
It is the challenge of the ENFSI Quality Assurance and Technical Working Groups to define and include these in best practice manuals. Some tools like competency tests, independent checks by another scientist, standardisation of comparison criteria, recognition software, database, could be used to reach this target.

Key words: Quality assurance, Subjective tests, Quality tools.

ISSN 1455-4194