



Criminalistics Section – 2005

B23 The Value of Trace Evidence as an Investigative Tool

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The goal of this presentation is to provide some case examples of unexpected circumstances or forms of trace evidence that have provided assistance in an investigation.

This presentation will impact the forensic community and/or humanity by serving as a reminder of some of the uses of trace evidence as an additional investigative tool that may solidify the findings in case.

DNA analyses alone may not resolve all cases that include biological evidence such as semen or blood. Even in cases where these materials are present, depending upon the case facts, trace evidence may assist substantially in the investigation.

Most forms of Trace evidence provide only class or comparative information. However, the microscope may be used to identify particles that provide important investigative information. Many of the types of materials discussed in this presentation are documented in available references on trace evidence such as Volumes of *The Particle Atlas* (McCrone and Delly (1973) and McCrone, Delly and Palenik (1979)), *Color Atlas and Manual of Microscopy for Criminalists, Chemists and Conservators* (Petrao and Kubic, 2004), *Mute Witnesses – Trace Evidence Analysis* (Houck, 2001) and *Trace Evidence Analysis* (Houck, 2003). Taking advantage of the trace evidence may provide crucial investigative information or establish a link between individuals or an individual and a location. The goal of this presentation is to provide some case examples of unexpected circumstances or forms of Trace evidence that have provided assistance in an investigation.

The presentation will highlight variations of the typically encountered types of trace evidence that may have greater value given special circumstances and assist in an investigation of an unknown perpetrator or illustrate association with the incident due to the presence of material or form or condition of the samples. Examples to be presented include evidence deposited in bloodstains, beaded spray paint microscopically identified on a roll of duct tape left at the scene which led to a subject, bloodstain patterns of the impression of the weapon (a table steak knife that had been cleaned and returned to a drawer in the kitchen) that demonstrated a garment worn by one of the victims, microscopic examination of a human hair wig used to disguise a perpetrator that led to finding that some imported are made from cadaver hair, the tire and partial license plate impression in snow at the scene of a multiple homicide and variations of fabric damage including an example that helped to substantiate statements of the victim in an acquaintance sexual assault.

This presentation will also include some unusual types of trace evidence. Examples include botanical samples such as thorns in a subject's clothing that were found to be consistent with thorns from a rose bush damaged by the perpetrator who jumped from a second floor window to escape from the scene, sequential layers of material deposited in hollow point projectiles, welding spheres microscopically identified from the debris on the clothing of an 8-year-old kidnapping victim, and air bag evidence such as makeup, fiber samples and starch granules that may assist in determining the driver of a vehicle involved in a fatal accident. If you do, you could say that provided information linking the items to the airbag.

The author gratefully acknowledges the permission of Glenn Schubert and the Illinois State Police for permitting the inclusion of photos related to air bag evidence in this presentation.

In summary, it should be emphasized that the use of trace evidence as an additional investigative tool may solidify the findings in any given case.

Trace Evidence, Investigative Information, Criminalistics