

Forensic Science and the Crime Scene

Editorial

While physical evidence is unlikely to entirely supplant eyewitness identifications or testimony, it has taken on an ever-increasing more important role and emphasis in various criminal justice systems around the globe. This is a reasonable evolution as it continues to become more obvious that confessions obtained by police officials from suspects may be coerced or subject to inaccurately generated self-incriminating statements. The physical evidence continuum begins at the crime or incident scene and continues through the forensic laboratory to the presentation in court. Albeit most participants in criminal justice are well aware of where physical evidence is generated, many individuals have the perception that science begins at the laboratory door [1]; the author was concerned that this subject has not received "... sufficient attention from the scientific community." In the opinion of this writer, this perception is reality in far too many jurisdictions but it is not only the fault of the scientific community. Prosecutors, police departments, investigators, and forensic scientists all share responsibility for this situation. Perhaps the only group that may be innocent of this criticism is the defense community.

The naïve belief continues to be that the laboratory, a mere testing facility, can glean from physical evidence whatever mysteries it holds based on the examinations dictated by the menu list on the laboratory request form [2]. It is the common mistaken belief that the field units, typically called "Crime Scene Units" or "Crime Scene Investigation Units", sans a scientific core can more than adequately handle whatever challenges are met in the field. The misconception is that given the right technology the police can handle the crime scene. The criminalists are only needed in the lab – to deal with the drug and DNA backlogs.

Somewhat ironically, this situation has not been helped in the United States by the National Academy of Science since their 2009 report "Strengthening Forensic Science in the United States: A Path Forward" was, for the most part, conspicuously silent on crime scene issues [3]. They superficially discussed uncertainty with respect to bloodstain pattern interpretation but essentially ignored where the scientific enterprise must begin – at the crime scene. As a partnership between the Department of Justice and the National Institute of Science and Technology, the National Commission on Forensic Science was formed in 2013. An essential component of this effort is the Forensic Science Standards Board (FSSB) of NIST. The FSSB is composed of three resource committees. Subordinate to the resource committees are five other committees, one of which is named "Crime Scene/Death Investigation." This particular committee contains six "Organization of Scientific Area Committees (OSACs)" including anthropology, medicolegal death investigation, dogs and sensors, fire and explosion investigation, disaster victim identification, and odontology. Surprisingly, the Crime Scene/Death Investigation committee contains no subcommittee devoted to general scientific crime scene investigation or reconstruction. An OSAC for bloodstain pattern analysis does exist as part of the "Physics/

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Pattern Interpretation" committee. So it would seem that the failure to recognize the critical role played by crime scene investigation/reconstruction continues at an influential federal level.

What is it that makes crime scenes challenging from a scientific perspective? The crime scene was not designed to be a recording medium. It contains the physical evidence record but it is far from a perfect medium for this purpose. In its totality the crime scene constitutes a record of the past (prior to the incident), during the incident, and the time immediately following the incident—when first responders, emergency medical personnel, investigators, and medical examiner personnel arrive. Every one of these individuals wittingly or otherwise affect change in the crime scene. Thus, the crime scene medium holds an array of information; both background noise and signal. The signal, using analytical instruments as an analogy, must be distinguished from the background. When the signal and the background are at similar intensities, it is extraordinarily difficult, if not impossible, to sort the two. A scientific approach, using the scientific method, by someone skilled in its use, is required to recognize relevant evidence. Mere observation of the evidence is not sufficient; you can see something but not recognize it. You can see the proverbial forest but not recognize the one tree that is crucial to whatever you are doing. Another problem is visualizing patterns that do not actually exist. What about physical evidence that is unrecognized? Could it not have a significant impact on the case? What about the interpretation of physical evidence that is detected and recognized? When is ad hoc experimentation required in a given case? Who should design such experiments? Who is in the best position to determine the adequacy of models (e.g., substitutes for human skulls to conduct back spatter experiments) for ad hoc experimentation or research?

An integral aspect of the scientific approach required at crime scenes is healthy skepticism. The introduction of skepticism of a preliminary hypothesis, with subsequent refinement, as additional facts are acquired, is imperative. The skill to do this is not obtained from completion of one or two workshops. It needs to be founded on a sound scientific education. An additional

source of initial scientific skepticism that needs to be used up-front at a crime scene should be generated from dialogue and possible debate with a colleague. When additional interpretation is required, depending on the nature of the case, these preliminary hypotheses can be further refined or rejected. Much of this will depend on the timely outcome of laboratory analyses.

Finally, it is essential for the criminal justice system to recognize that science must begin at the crime scene. If criminalists and other forensic scientists don't express a need for this who will? The failure to use science up front at crime scenes, coupled with criminalists in the forensic laboratory relegated to acting as technicians, only increases the chances for wrongful convictions and other adverse consequences.

References

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