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EDITORIAL

Moving Toward New Requirements for the Admissibility of Evidence

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The admissibility of forensic science evidence requires the side proffering the evidence to demonstrate that Daubert or the Federal Rules of Evidence, Rule 702 were followed. Thus, testifying expert witnesses need to give careful consideration to how they demonstrate that they have met the necessary requirements. Ultimately, the court is asking the expert to prove the methods used and the conclusions derived are reliable. A showing that the procedures used were done properly, that the method used was properly vetted, that there are known error rates, that the expert received appropriate training, and so forth, are necessary for the information resulting from expert's examination to be admitted by the court as evidence. Experts are often questioned about how certain are they of their conclusions and opinions. Forensic DNA evidence was among the first type of physical evidence in criminal cases to use statistics and likelihood ratios as a way to convey the degree of certainty of the expert. Yet there are many other types of physical evidence, specifically pattern evidence that cannot use statistics because none exists. Rather, the expert's training and experience must be used to prove that connections between the known and questioned items of evidence are connected since there are no statistics to rely on. But given a shoe print, for example, with wear patterns and gouges in the heal and sole, how can we ascribe a numeric probability value to that item, and how may we testify when those probabilities may not be known until sometime in the future, if ever? To a degree, an opinion is such a case sounds much like ipse dixit—it is because I say it is.

In 1923, the US District of Columbia Circuit Court established the Frye standard (Frye v. United States, 293 F. 1013), in a case which considered the admissibility of polygraph testing. The court held that expert testimony must be based on scientific methods that are sufficiently established and accepted—the so-called "general acceptance test." The court wrote:

> *Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while the courts will go a long way in admitting experimental testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.*

In 1992, Daubert v. Merrell Dow Pharmaceuticals, Inc. 509 U.S. 579, 113 S.Ct. 2786 modified the Frye rule and expanded the admissibility requirements for scientific evidence. In 1999 the Supreme Court published the Kumho Tire Co. v. Carmichael, 526 U.S. 137 case and expanded the rule to include scientific and *technical* expert testimony.

In Kumho Tire, the courts considered expert testimony in a case concerning tire manufacture and the resulting tire failure. The expert in Kumho Tire relied upon his experience in tire failure. The court noted that his examination did not meet the Daubert obligation. It went on to opine that *all* expert opinions, whether based on scientific and or technical subject matter, are required to meet the same standards. (The expert grounded his opinion on observations made on the tire in question and testified that his opinion was based on his experience, but did not give scientific or technical information to backup that opinion.) The court concluded that an expert's testimony had to show that the techniques used in the examination and subsequent testimony was reliable and met the same standards laid out in the Daubert case. It stated, in part:

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> *"The Daubert 'gatekeeping' obligation applies not only to 'scientific' testimony, but to all expert testimony. [Federal Rules of Evidence] Rule 702 does not distinguish between 'scientific' knowledge and 'technical' or 'other specialized' knowledge, but makes clear that any such knowledge might become the subject of expert testimony."*

Thus, all expert opinion testimony (that is for expert evidence proffered in States following the Daubert rule) whether scientific or technical, is subject to the same requirement as outlined in the Federal Rules of Evidence, Rule 702:

(a) that the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
(b) that the testimony is based on sufficient facts or data;
(c) that the testimony is the product of reliable principles and methods; and
(d) that the expert has reliably applied the principles and methods to the facts of the case.

Embedded within court's requirement to ensure the dependability of the forensic science laboratory's work and the expert's testimony is the notion of reliability. The court along with Rule 702 of the Federal Rules of Evidence lays out how scientific and technical expert evidence can be shown to be reliable. So the question begs itself: how may individual expert witnesses or, for that matter a laboratory, demonstrate that the work done in the examination of evidence be shown to be up to some standard?

In Daubert, the U.S. Supreme Court suggested that the following factors be considered as a means to determine the admissibility of scientific evidence:

- Has the technique been tested in actual field conditions (and not just in a laboratory)?
- Has the technique been subject to peer review and publication?
- What is the known or potential rate of error?
- Do standards exist for the control of the technique's operation?
- Has the technique been generally accepted within the relevant scientific community?

Crime laboratory managers and testifying expert witnesses need to give consideration on how they might respond to such questions. How would the expert testify about reliability including "known or potential error rates?" For example, in the case of error rates, is the lawyer asking about measurement errors, lab-wide or individual examiner errors or perhaps something else? Clearly, persons who testify as expert witnesses must have an idea about how they would answer such queries. This should include an understanding of a laboratory's quality assurance program, the way in which testing methodologies are vetted and introduced into practice and an understanding of the research behind a procedure.

Some standards for the control of a technique as well as the overall operation of a forensic science laboratory are more easily addressed. The 2009 National Academies report (NAS report) called for mandatory accreditation of all forensic science service providers. Recommendation 7 of the NAS report states that all laboratories and facilities (public and private) should be accredited, and that the determination of appropriate accreditation standards should take into account established and recognized international standards, such as those published by the International Organization for Standardization (ISO). While not fully in practice, forensic science providers can anticipate a requirement for them to become certified by approved certification organizations.

Thus, crime laboratory accreditation is one way to convey to the court that laboratory practices meet high standards. Laboratories accredited under ISO 17025 are required to keep track of a host of quality assurance records, maintain written testing protocols (which may periodically change), keep records on reagents use and preparation, equipment maintenance, employee training and proficiency tests, employee errors, and a host of other thing related to quality within a laboratories operation. In fact, the list of QA related matters can be quite large.

How can crime laboratories cope with this glut of information in a manageable way? Laboratory Information Management Systems, or LIMS, hold one answer. Systems can mine data of individuals, groups of analysts, laboratory sections, and the entire lab and produce reports that can demonstrate to a judge that the lab's work meets standard protocols and are done properly on a given case. Additionally, while a LIMS cannot force examiners to use controls, it can enforce the recording that controls were used in an analysis, and can enforce the recording of the results of such controls, e.g. positive control, negative control, reagent blanks, etc.

While crime lab accreditation can never conclusively guarantee that mistakes did not occur, disclosing the extent to which labs maintain their control over quality is an important step, and laboratory accreditation and LIMS systems are ways to help demonstrate that degree of effort.

Another subject for consideration is how are we expressing levels of certainty—how certain is our opinion about something? At one time, experts were allowed to state, with virtual certainty that two items of evidence were unique and came from a common source. It was not uncommon that a fingerprint expert would state that two prints came from the same person, to the exclusion anyone else. Today, a statement expressing that level of certainty is problematic. DNA evidence has been the principal cause of this change and probabilistic statements are viewed as the appropriate way to express levels of certitude. Yet here is a complication: how can we express the likelihood that two items came from a common source when their probabilities of occurrences are unknown? Given a shoe print with wear patterns and gouges in the heal and sole, can we ascribe a numeric probability value to that item, and how may we testify when those probabilities may not be known until sometime in the future, if ever?

Indeed, the admissibility of scientific and technical expert evidence has some ways to go before these issues are fully dealt with. Furthermore, we can anticipate future court decisions which touch on these very issue.

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