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FORENSICS UNDER THE GUN

Commonly accepted techniques may lack scientific value

By Julius (Jay) Wachtel. On February 17, 2004 Texas inmate Cameron Todd Willingham was strapped to a gurney and given a lethal injection. He had been convicted of arson and murder in a 1991 house fire that killed his three daughters. Evidence against him included the statement of a jailhouse informer who said that Willingham confessed and scientific testimony by the State Fire Marshal's office that the fire was deliberately set.

Willingham protested to the very end that he was innocent. Now it looks like he might have been right. In August 2008 the Texas Forensic Science Commission agreed to review a 2006 report by five nationally recognized fire experts who refuted the "arson indicators" cited by Texas authorities at Willingham's trial and said the fire was accidental. One of these indicators, crazed glass, was once thought to be evidence of a superhot fire fed by accelerants. It's now known to be caused by spraying water on hot glass. According to the experts, another indicator, burn patterns in the floor suggestive of accelerants were meaningless in a fire that burned as hot as the one that destroyed Willingham's home. And so forth.

In addition the Commission will also be considering the wrongful conviction of Ernest Ray Willis, who spent 17 years on death row for an arson/murder much like the Willingham case. While preparing to retry Willis (his case had been overturned on technical grounds) the prosecutor concluded that the State Fire Marshal's "scientific" testimony was mistaken and that the fire was accidental. Willis was released.

On March 11, 2004 terrorist bombings in Madrid train stations killed 191 and injured two-thousand more. During their investigation Spanish police recovered fingerprints from inside a bag of unexploded detonators and furnished images of the prints to the FBI.

FBI fingerprint examiners digitized the images and ran them through the national database. They soon identified the prints as belonging to Brandon Mayfield, a Portland attorney who was Muslim and once represented a suspected terrorist in a civil case. Confident in their conclusions, the FBI ignored Spanish investigators who insisted that the prints didn't match and that the bombers were Moroccan terrorists with no known connection to Al Qaeda or the U.S. On May 6, 2004 the FBI arrested

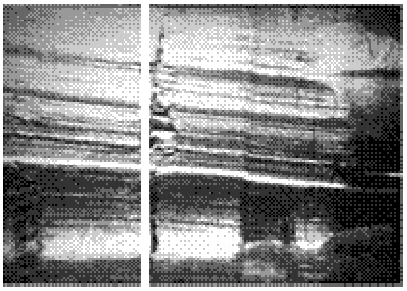
Mayfield as a material witness in the bombings and searched his residence. Within days Spain positively identified the man who left the prints as a known Algerian terrorist. Two weeks after arresting Mayfield the FBI let him go. He got $2 million in taxpayer cash for his troubles.

How could this happen? Found or "latent" fingerprints are nothing like the complete, neatly inked fingerprints taken from job applicants and persons arrested for crimes. Instead, they're often fragmentary, smudged, distorted and overlapping, which can make it difficult for examiners to identify the "minutiae", the islands, dots, bifurcations and ridge endings on which comparisons rely. (In this example, a "good quality" latent is on the left, and the same finger inked is on the right.)

Every State and the FBI have large repositories of digitized fingerprint cards. The FBI holds prints for nearly one-hundred million persons, split about evenly between arrestees and applicants. Running recovered prints through these databases yields cards with the closest matches. It's up to local examiners to order those of interest and microscopically compare them to the latent to see if there's a fit. Generally at least seven minutiae must match, while only one inconsistency disqualifies. Extrinsic factors such as investigator's suspicions must never intrude on an examiner's judgment; if they do, as what apparently happened in Mayfield, the examiner (in the FBI's case, several examiners and their boss) might mistakenly "find" matching minutiae in the latent that simply aren't there.

Firing a weapon leaves markings on bullets and cartridge casings that are supposedly unique to that particular gun. If cartridge casings or bullets found at a crime scene or extracted from a body have a sufficient number of identical markings and no inconsistencies examiners will testify that they were also fired by that gun.

That's the belief. However, a recent report by the National Academies concludes that while "one can find similar marks on bullets and cartridge cases from the same gun," the assumption that only that gun could have produced those markings "has not yet been fully demonstrated."



Even if we believe that ballistics evidence is reliable, humans aren't. In this comparison a recovered bullet in excellent condition is on the left, and a bullet test-fired

through the same gun is on the right. We can see that the striations left by the barrel line up perfectly. In the real world, though, bullets are often deformed and fragmented, making comparison difficult. Detroit PD's lab was recently shut down after State Police auditors found three "false positives", cases where examiners mistakenly reported a match that didn't exist.

Why did the State come in? After a recent murder conviction a retired State firearms examiner conclusively demonstrated that shell casings found at the crime scene came from at least two weapons, not one as the police lab claimed. The judge dismissed the case, which will be retried.

Everyone's heard of Phil Spector, the celebrity murder defendant whose first trial ended in a hung jury (his retrial will begin any day.) There's no disputing that the victim, Lana Clarkson, died from a bullet discharged while a gun barrel was in her mouth. Spector claims that he was six feet away when the gun went off. His claim was propped up by blood spatter expert Stuart James, who said that droplets could travel six feet. But Sheriff's criminalist Dr. Lynne Herold, who admitted she had taken one of James' courses, said no, that their range was at most three feet. That little duel is likely to replay itself. Meanwhile, what are we to think of blood spatter evidence? Is it meaningful or not?

Maybe CSI isn't all that it's cracked up to be. Physical evidence has to be collected, bagged, tagged and interpreted by fallible humans who can slip at any stage of the process, damaging the goods, making them out to be what they're not, or inferring that they mean something they don't. It's happened with arson, fingerprints, ballistics and blood spatter. Last week we mentioned that goofs leading to wrongful convictions have even happened with DNA, which is particularly scary given its aura of infallibility.

According to a recent article in the New York Post, the National Academy of Sciences is expected to shake things up this December with a report that will question the value and accuracy of accepted forensic techniques.

Not to worry, Joe Friday. Looks like shoe leather will be in style a while longer.