



Impossibility, bias and exaggeration

Forensic scientist Simon Bunter puts old fashioned fingerprints under modern day scrutiny

The phrase ‘your fingerprints have been found at the crime scene’ is one that has been used in police interviews and courtrooms for decades. It implies that a person has been present at a specific location at the time of the offence. This evidence is usually presented at court with a level of certainty and conclusiveness that is rarely challenged.

Is fingerprint evidence really that clear-cut? In an era of advancing technology and scientific research, fingerprint techniques sometimes seem stuck in the past. Despite several high profile errors, comparisons continue in a manner similar to 100 years ago.

The modern scientific approach we adopt at Keith Borer Consultants allows us to correctly interpret fingerprint evidence. In the three case studies described below, this has demonstrated that the defendant was innocent.

Case study 1: The security gate



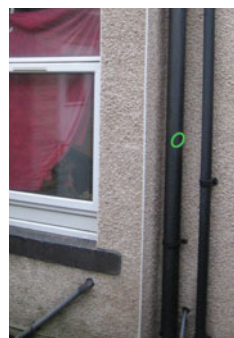
One of the most interesting cases I have worked on involved an offender trying to break through a metal security gate that was fixed across the front door to a flat in a residential tower block. Fingerprints on the gate were correctly identified to a local male but he insisted he had never been to that block of flats. The presence of his prints on the security gate appeared to suggest that he was lying. When the evidence was correctly interpreted, however, we showed that it

was impossible for him to place his prints in those positions during the crime. He had actually placed his prints onto the gate 10 years

earlier during work experience in a metal fabricator’s workshop. He had touched the gate while carrying it, prior to it being erected across the door of the flat.

Case study 2: The drainpipe

It is a widely held belief that environmental factors such as rain and sun will damage or destroy fingerprints. While this might be true in some cases, there is little published scientific research to support the conclusion and sometimes there is overwhelming evidence to the contrary.



A plumber fitted a drainpipe to the outside of a terraced house. In doing so, he deposited his thumb print onto the pipe. The print persisted for 10 years and was only found when a crime scene investigator (CSI) attended the premises where it was suspected a thief had climbed a drainpipe. The plumber told police why his print was there and also explained (quite correctly) that the adhesive materials he was handling at

the time might have caused his prints to remain for a prolonged period. Police contacted his employer who provided records confirming that the plumber had fitted the drainpipes to that house 10 years previously.

Far from this being the end of the matter, however, the plumber was charged after the CSI provided a statement in which she (quite incorrectly) stated that fingerprints could not survive for this length of time. Our examination of the drainpipe showed that the print was still present on the drainpipe, it being extremely robust and difficult to remove. It could have easily survived the intervening 10 years and

was in exactly the position the plumber described touching when he fitted the pipe. Furthermore, information gained during our scene visit indicated that the real offender had climbed up a completely different drainpipe!

Case study 3: The rugby club

Even the most seemingly destructive actions might not remove identifiable fingerprints. Finger and palm prints had been found on an internal door of a rugby club that had been burgled. The prints were correctly identified to a male who had previously played rugby for the club and been in the clubhouse many times. He had, however, stopped playing rugby four years before the offence and insisted he had not been back in the clubhouse since. It then came to light that the door bearing his prints had been painted white 18 months before the offence. Surely there was no way his prints could have survived being painted over?



Our examination showed that his prints were actually formed as 3D impressions in an underlying layer of much older yellow paint that had been applied years before the offence. Our examination showed that more than four years ago,

at a time when he had legitimate access to the clubhouse, the male had touched the door when this yellow layer paint was still wet. His prints remained fixed as a 3D impression in this yellow paint. When the new layer of white paint was applied 18 months prior to the offence, far from covering up the impressions, it simply provided a light coating to them meaning the impressions were still very much visible through the new layer of paint. When the CSI recovered the prints they did not realise they were formed in paint. It was only when we removed the outermost layer of paint as part of our forensic examination that we were able to show that the male's seemingly implausible explanation was correct.

What have you touched today that might be a crime scene in 10 years' time?

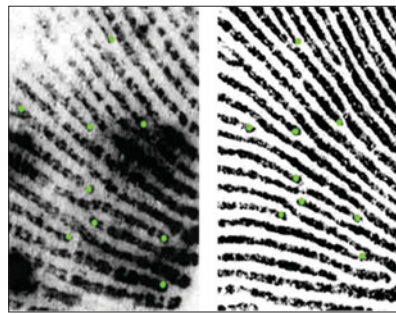
The sets of circumstances in the above case studies might seem rare, but we all leave our fingerprints on lots of different items and surfaces every day. These locations or items could easily become part of a crime scene.

Fingerprint identifications: 'No doubt'

The above studies are all cases where fingerprints were correctly attributed to defendants. The process of fingerprint comparisons, however, is inherently subjective. Previous high profile errors and misidentifications have resulted in criticisms by court of appeal judges and multiple recommendations from The Fingerprint Inquiry Scotland in an effort to try and improve fingerprint processes. Unfortunately, many of these recommendations go unheeded.

One persistent problem is the evidential reporting of fingerprint results. Whereas forensic scientists in other areas use a scale of support to articulate the strength of the evidence, almost all police fingerprint officers state that they are in 'no doubt' for every identification result, regardless of the quantity or quality of the correspondence, even if there are differences. Is such certainty really justified? To fully consider this issue, it is perhaps best to start with a fundamental question: are fingerprints 'unique'?

Are fingerprints 'unique'?



It is generally accepted that entire fingerprints are unique but there will be some fingerprints from different people that are extremely similar.

To explain it another way; the entire print on my right forefinger

will be different to all 10 of your fingerprints. There will, however, be small sections of my right forefinger print that will correspond to sections of your fingerprints and therefore parts of our fingerprints will be indistinguishable. With different fingerprints sharing similar features, the main question facing a fingerprint examiner is: 'how much correspondence is needed to safely attribute a crime scene print to a particular person and exclude all others?' The answer to that question used to be '16 matching ridge characteristics', until this standard was abolished in 2001. Now the criteria is '...sufficient... ridge characteristics... in agreement with no unexplainable differences.'

Cognitive bias

A major risk to fingerprint accuracy is cognitive bias. In short, the good quality print in a person's reference form can influence the examiner into thinking they can see corresponding ridge characteristics in poor quality areas of a crime scene mark. This can result in errors and an exaggerated number of corresponding ridge characteristics being quoted in evidence.

Perhaps the best example of this occurring is in *R v Smith (2011)*. Two ridge characteristics in a fingerprint in blood at a murder scene looked generally similar to a small area in the defendant's fingerprint. Two corresponding ridge characteristics, however, would not normally be sufficient for an identification. The police fingerprint expert then spent a considerable amount of time comparing the bloody mark against the defendant's print until eventually he found an extra 10 'matching' characteristics that he did not originally observe. These features were clear in the defendant's fingerprint yet they were simply not visible in the crime scene mark. He then declared the mark had been 'identified' with 12 matching ridge characteristics and inevitably stated that he had 'no doubt' that it had been made by the defendant. The court of appeal subsequently quashed the conviction and in later proceedings numerous other fingerprint experts stated that the identification was unreliable and the mark in blood was not deposited by the defendant.

Closing remarks

Exaggerated fingerprint identification evidence and misinterpretation of how the print arrived on the surface are not uncommon, although it is very difficult to tell whether it has occurred by reading an evidential statement. What appears on paper to be absolute irrefutable proof can sometimes fall apart once it is re-examined using the correct scientific processes.

Simon Bunter is a forensic scientist specialising in the interpretation of fingerprint evidence for Keith Borer Consultants. He specialises in determining how and when fingerprints were placed and is also an expert in testing the strength and validity of alleged fingerprint 'identifications'.

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