About the Author:

Warren Ashton retired from the Royal Canadian Mounted Police as a Sargent in 2007 after 27 years. He spent the last 12 years of service within the Forensic Identification field throughout North Western Canada, most recently as head of the R.C.M.P. 's Forensic Services Program for the Province of Alberta .
His experience in this field has ranged from routine crime scene examinations to some of the most notorious and brutal murders in Canadian history. He has individualized thousands of Criminal Fingerprints throughout Canada and has consulted internationally on disputed fingerprint cases from around the world. He is a recognized expert on Fingerprint Evidence and has provided Expert Testimony at the provincial and Supreme Court level in three different Provincial jurisdictions throughout Canada.

He has developed several unique and innovative Training Programs and teaches these programs to Police and private sector agencies, both in Canada and Internationally.

He has assisted foreign countries such as the UAE in the modernization of their approach to Forensics. He has also assisted in the FBI's development of a new computerized fingerprint identification tool.

He now owns a Forensic Consulting company in Canada and works with Police and Government Agencies around the World in Training, and Consulting,

Fingerprint Identifications (science or not)

Much has been written over the years, and even more has been taught to forensic fingerprint experts, promoting the scientific nature of our work. We've all come to accept the two basic principles of " Uniqueness and Persist ency" as the basis for our work. We are all quite confident that no two fingerprints are ever the same and that fingerprints never independently change.

We've all personally seen enough fingerprints over the years to come to a solid understanding of the very unique characteristics that differentiate one from another. We analyze them and scrutinize them. We read articles written by scientists and practitioners who have made their life's work the study of fingerprints. Ultimately, everyone in this discipline agrees with the two basic principles, or they wouldn't be in the business.

Is what we do a science? Make no mistake, the basis for the individualization of fingerprints is founded in science. Genetics, anthropology, anatomy, and dermatology are just a few of the sciences upon which we base our work.

We, however, do not conduct science! We conduct a series of experiments and sequential testing, according to prescribed procedures, a scientific methodology. We utilize our powers of observation and our mind's ability to organize shapes. We continue to test until we have examined all the material before us. Finally, at some point we reach one of three conclusions.

The two samples were made by the same individual. There is sufficient agreement between the two samples so as to exclude any other possible donor.

The two were not made by the same individual. There is a sufficient lack of agreement so as to eliminate the individual as a donor.

There is insufficient detail present to individualize. The individual can neither be identified nor eliminated due to a lack of sufficient detail.

Reaching these conclusions, however, requires something not found in science. In essence they require us to utilize our training, our experience, our judgment and our knowledge to arrive at an opinion. On most occasions, it's a very small leap. Both the known and the unknown fingerprints have sufficient clarity that a great deal of material is present for scrutiny. These comprise the vast majority of fingerprint identifications and their similarity or dissimilarity is self evident. But what happens, for example, when the crime scene print lacks clarity, is distorted, or is only partially present. The theoretical value placed upon Persistency and uniqueness fall short of providing answers in this case. It becomes a question of interpretation of the detail present. This is where experts may differ in opinion based upon their personal knowledge, experience, and training.

The question that begs to be asked is; " <u>Could a fingerprint impression ever be developed with dissimilarities so disguised by distortion and poor clarity that agreement with a known print could be misinterpreted.</u>" The answer must surely be "Yes."

Examine the Madrid Bombing Print for example . Clearly, expert opinions have been expressed covering all three possible conclusions in this case. At least one opinion has been proven to be wrong.

Despite all the rationale that has been tossed around attempting to explain how such a gross error could have been committed, I believe this error, as well as many other mistaken identifications, have their root cause in various forms of Bias on the part of the expert.

1. "Subjective bias", - a belief that sufficient agreement existed.

Those experts who examined the print and incorrectly identified it believed they had sufficient detail present and were able to make that subjective leap.

2. "Expectation bias", - seeing what you expect to see.

They saw what they expected to see given the limited detail present and were able to rationalize any inconsistencies.

3. "Contextual bias", - influenced by extraneous circumstances or facts.

They had to have been influenced, in the first instance, by their knowledge of the suspect, and his Religious Beliefs.

4. "Confirmation bias" - knowing another expert had already made the call.

The knowledge that another expert or experts had identified this fingerprint must have been an extremely powerful catalyst for excessive tolerances.

Underlying this bias is the belief system fostered within the fingerprint community that an opinion, once tendered, is a fact.

I am certain that all the experts involved scrutinized the print diligently and agonized with it before reaching their opinion, but eventually they did come to an erroneous conclusion. It is easy to dismiss the work that they did as unscientific or unprofessional, but I do not believe that either of these terms apply. I believe that they conducted a scientific process in a very professional manner and took their scientific methodology as far as it would go.

It was only at the point between science and subjectivity that the error occurred. That grey zone where experience, intuition and perhaps talent are key components.

Examine the ACEV methodology. Analysis – Comparison – Evaluation – Verification

At what point during this process does subjectivity enter into it? I would argue that every aspect of this process contains elements of subjectivity. For example; when we attempt to analyze the unknown we examine a series of factors in a "bottom up" process. We examine the substrate, the matrix, elements of pressure distortion, clarity, etc. The analysis process requires us to examine the latent and interpret the information we see. As we were not present when the print was deposited, we must use our perception, experience and knowledge to bridge the gap between what is visible and what we believe were causative factors. This is a highly subjective process. Experts may have differing interpretations of what they visualize, a clear indication of subjectivity.

Likewise during the comparison process we identify an area on the unknown and attempt to locate agreement on the known. During this process, we must quantify and validate any inconsistencies which might preclude agreement. In essence we must rationalize areas of inconsistencies, and either accept them or reject them. Once again we must rely on our judgment, our experience and our perception. Again the process is extremely subjective.

During the evaluation process, all the various components under scrutiny have been quantified according to values and criteria we have placed on them. We cannot accurately verbalize this process because it is so subjective. The question of sufficiency comes into play and at some point, we make a determination as to authorship or not. Different experts have different thresholds of sufficiency and even if their conclusions are the same, they were likely arrived at from different perspectives. Once again subjectivity enters the process.

So, the end result is we conduct our "scientific methodology" (ACEV) in a prescribed format which is objective, structured and repeatable. At various points, however, during this process, we utilize a very non-scientific, if not intuitive, approach to reach an opinion with regard to the print. Again, when significant detail and clarity exist, there is very little need for intuition or experience. These are the non-contentious identifications that make up the vast number of those we encounter.

But what about the 1% that really test our mettle.

These are the very difficult and often contentious fingerprint opinions for which the scientific process fails to provide the answer. In as much as The Madrid Case has been highly publicized and an actual suspect was truly identified, how many cases are out there where an erroneous identification has been made, verified, and possibly tendered as evidence at trial? The case is closed and never contended. The truth is we have no way of knowing.

What is the most difficult fingerprint identification you have ever made? Let me guess, it was a heavily distorted, twisted, dirty, virtually illegible, mess. We've all been there, staring at this mess and struggling at the point between an identification and a non-call. I for one have identified several fingerprints that I felt were very near the minimum level of detail required, and yet I made the call. I have also not identified several fingerprints that I strongly believed may in fact belong to the suspect. In the case of the latter, I just could not bring myself to the final conclusion of an absolute identification. I'm sure your experience is the same.

What is it then that causes us to either make the call or not? It has to be that combination of confidence, and intuition coupled with the sound understanding of friction skin. The problem is, however, that when experience is lacking, the only alternative is to rely upon scientific methodology and knowledge of friction skin structure. In other words, <u>the theoretical knowledge of our discipline is being relied upon as a basis for identification.</u>

By what legal or logical justification can we state that because we have a scientific understanding of friction skin and utilize a scientific methodology to arrive at a conclusion, that conclusion must thereby be scientific and absolute?

This statement is fundamentally flawed. It makes no allowance for our intuitive capacity, or the requirement for interpretation of the evidence.

We need to understand that the very process that produces correct results also produces incorrect results, even among qualified experts, when interpretation fails. The very existence of this possibility suggests to me that we need to find a better explanation for the work we do.

It is my opinion that the science surrounding fingerprint identification extends only as far as the process we utilize to conduct our analysis. We use a process of objective testing and re-evaluation in order to bring us toward an opinion. This process is repeatable and quantifiable, in terms of its use in the verification process as well.

The individualization of an unknown fingerprint to a known fingerprint is simply a conscious affirmation of a subconscious sentiment. As experts, we quantify, analyze, evaluate, filter, and diffuse all the intrinsic details of a fingerprint as we progress through it. We do this unwittingly, effortlessly and largely subconsciously as our mind tries to organize the patterns and shapes we see before us. Details that don't quite match, yet could be tolerated for various reasons of clarity and uniqueness, are individually quantified and filtered. Intrinsic details with extremely rare features are given a greater individualizing power than those considered to be mundane or pedestrian. Features, such as pressure distortion and shifting that, if present, support the exact circumstances of their existence, are also evaluated in concert with the facts.

The subjective weight of all the intrinsic details provides the expert with a degree of certainty which is not yet scientifically quantifiable. It is that certainty, based upon a sound knowledge of friction skin development, as well as a wealth of experience, that empowers the expert to express his opinion. This particular aspect of the process is by no means scientific.

It is comparable to the diamond cutter who, based upon his geological knowledge of diamond crystal formations and his experience in cutting rough stones, visualizes the final polished stone within the rough crystal and strikes the diamond in exactly the right place to enhance it's brilliance.

The danger for both fingerprint experts as well as diamond cutters lies in letting the scientific process of your analysis overshadow the genius of your mind. In order to properly do our jobs, we need to unlock the subconscious mind and allow it to work.

The subconscious mind completes its behind the scenes process regularly, effortlessly, and accurately every day. Consider the stranger approaching you on the street. He bears some similar characteristics to somebody you know. As he draws closer, those intrinsic characteristics that define our physical being become more and more discernible. Somehow, intuitively, we either recognize him or don't recognize him. Did we need his exact body weight, his exact height, his distinct hair color tint, or the name of his tailor? No. All we needed was a frame of reference stored within our subconscious mind, a non-cognitive template working below the surface. Our mind is able to filter the vast array of information available and distill it down to a point where recognition is felt at the subconscious level. Consider identical twins. Even when every visual clue tells us they are identical, certain differences are still perceived at a certain level. We may not even know which twin is which, yet we perceive these differences.

The difficulty in a forensic environment is trying to quantify this intangible process in a strictly legal and evidentiary manner. How does a court evaluate the capacity of your subconscious mind to quantify intrinsic details?

Examine the term "Opinion". By definition it is highly subjective and often contentious in nature. An opinion may or may not be supported by other experts. An opinion is an expression of a certainty, the basis of which is known only to the author of that opinion.

The Canadian Oxford Dictionary defines "Opinion" as:

1. "A belief or assessment based on grounds short of proof,"
2. "A view held as probable,"
3. "A formal statement of professional advice,"

We must remember that at the end of the day, after all the scientific methodology and precise terminology is put to rest, we, as experts, are left with our subjective opinion. We express this opinion with the solemn belief in its integrity and its evidentiary value. We believe it to be true and beyond reproach, but is it?

The courts have generally recognized the qualifications and expertise of fingerprint "Experts" over the years, and have allowed us to tender "Opinion" evidence as "Facts". They are regularly entered as evidence without any significant challenge. The court, however, remains the only true "gatekeeper" or filter through which the evidence is tendered. At present, if our credentials are adequate and our presentation is meaningful, our opinion is accepted.

Perhaps in evaluating expert witness evidence, the courts need to give consideration to more than just the academic qualifications of the expert. They also need to consider the capacity of the expert to interpret the evidence and tender an opinion which may not be legally supportable.

Likewise, we as experts need to understand that this work we do is not a science. If it was, two experts could not arrive at the same opinion by following two entirely different evaluative processes. It is a highly subjective and sometimes contradictory expression of a perceived truth, based upon studious observation and testing. When the evidence is overwhelming, the opinion is obvious and should be readily accepted. However, when the evidence is scarce or ill defined, the opinion needs to be scrutinized to a higher standard.

In the Verification process, we need to be extremely vigilant with regard to various forms of bias. We need to approach every independent verification from the perspective of disproving the hypothesis as opposed to proving it, or being the "Devil's Advocate". Replacing the term "verification" with a more representative term such as "Independent Peer Review" may re-enforce this type of approach. The difficulty then remains convincing the courts that despite every effort being made to disprove the original conclusions, they are supported by the reviewer and they must be allowed to stand.

In conclusion, it is my "non-scientific" opinion that the Individualization of Fingerprint Evidence is not a Science in any way shape or form. I respect the scientific roots of the discipline and the scientific understanding that I have gained concerning the development of friction skin, however, when I sit at my desk with two fingerprints before me, it is comforting for me to know that my opinion is just that "an opinion". It is an expression of my belief, based upon my observations and my experience. It is open to interpretation by other experts and subject to peer review. It is not a statement of fact, though it may be supported by the weight of other opinions.

If you disagree with my expert opinion, it means one of us has over estimated our level of expertise and perhaps misinterpreted the evidence before us. This goes without saying.

We must, however, consider as well that if you agree with me, there is also the possibility that we have both over estimated our level of expertise and perhaps both misinterpreted the evidence before us.

Perhaps it is better that we always disagree and are forced to re-examine the evidence until we can finally come to agreement. This is the essence of Independent Peer Review and it needs to be approached from this perspective in every case.

In other words, independent peer review of contentious or difficult individualizations requires a level of scrutiny beyond the unit or possibly beyond the agency itself. True independent peer review must originate from a perspective wherein the reviewer believes the results to be potentially flawed, or at least open to interpretation, and therefore seeks to reach their own independent conclusion.

The single most important piece of the Fingerprint Identification Puzzle is the Independent Peer Review of that opinion by one or more persons or agencies.

This applies equally to individualized impressions as well as eliminated impressions.

Warren Ashton.