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SCIENCE OR EXPERIENCE; what is more relevant?

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Abstract - *It is very important that when we use science to determine the validity of evidence or information that it is done in a manner that is acceptable to the scientific community and the legal community, but what happens when “experience” is used. The use of forensic practitioners to provide ‘expert’ evidence and opinion must meet the Daubert/Frye and now Kumho tests. This paper will endeavour to demonstrate what is best for a practitioner to have and what does the judiciary require for ‘expert’ evidence to be accepted? Science and/or Experience, what is more relevant? Evidence and the Courts depend upon the establishment of a reliable basis of fact, because at the end of a trial, a Judge or a Jury will be compelled to reduce a complex slice of human experience with all its subtlety, to what is, in essence, a one line answer: “I believe you, or I don’t.”.*

Keywords: Practitioner, Science, Experience, Knowledge

1 Introduction

It is very important that when we use science to determine the validity of evidence or information that it is done in a manner that is acceptable to the scientific community and the legal community, but what happens when “experience” is used. Is a scientific approach more valued than experience? This paper will look at the role of forensic practitioners using science and/or experience in supporting (or not) evidence and information being presented in the courts. This paper will look at how science and experience has been used, what has been the result and will endeavour to demonstrate using cases, as to why forensic practitioners need to keep evaluating themselves in relation to their forensic expertise.

In the United States, the National Research Council [1] of the National Academy of the Sciences concluded that; with the exception of nuclear DNA analysis, no forensic method has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual or source.

The council also stated; “For a variety of reasons—including the rules governing the admissibility of forensic evidence, the applicable standards governing appellate review of trial court decisions, the limitations of the adversary process, and the common lack of scientific expertise among judges and lawyers who must try to comprehend and evaluate forensic evidence—the legal system is ill-equipped to correct the problems of the

forensic science community. In short, judicial review, by itself, is not the answer.”

In the same year Chief Justice Robert French of the High Court of Australia in a presentation to the Medico Legal Society of Victoria said “the more technically or scientifically complex the issue for determination, the greater the challenge for the courts whether in patent law or other fields. There are some areas, particularly those involving computer science and complex software that may test the limits of the capacity of the courts to answer the composite questions of science and law to which they give rise“ [2].

We are living in world that is using complexity to resolve complexity. We expect advancement, we expect solutions and we expect it to be right. As forensic practitioners there is an expectation that we are experts in our field, we have qualifications, we have accreditation, we have practical experience and we have the under pinning knowledge of how our speciality works, is used and accepted, but what happens for the practitioner who has qualifications but limited experience (in the field) and the practitioner who is experienced but has only limited or no qualifications?.

Gary Edmond [3] said that the failure to engage individuals with the requisite knowledge, training and experience can produce a variety of mistakes, faulty assumptions and risks, even if these are not appreciated during trial and appeal processes.

Were as James Robertson [4] made comment, that it is a worrying outcome if academic researchers were to be excluded from giving “relevant” evidence simply on the basis of not being practitioners. He continued by saying that he does value experience; it is an inescapable qualitative factor which is relevant. However practitioners should not hide behind experience as an excuse or substitute for appropriate research and academic rigour. There is differing opinion as to what a forensic practitioner should have, thus there is a need to consider whether the value of science outweighs experience, or vice versa, or are both equal given the circumstances..

1.1 Definitions

as defined by 2005 NSW Law Reform Report 109 – Expert Witnesses.

- **expert**, in relation to any question, means a person who has such knowledge or experience of, or in connection with, that question, or questions of the character of that

question, that his or her opinion on that question would be admissible in evidence.

- **expert witness** means an expert engaged for the purpose of:
 - providing a report as to his or her opinion for use as evidence in proceedings or proposed proceedings, or
 - giving opinion evidence in proceedings or proposed proceedings.
- **expert's report** means a written statement by an expert (whether or not an expert witness in the proceedings concerned) that sets out the expert's opinion, and the facts on which the opinion is formed, and contains the substance of the expert's evidence that the party serving the statement intends to adduce in chief at the trial.

2 Background

In what follows, the authors have used cases where the court has mentioned what is expected of experts who provide evidence and what is not acceptable.

2.1 The Frye vs Daubert Cases in the USA

In the USA, historically, scientific evidence, broadly defined, had to be generally accepted as reliable in the field in which it belongs, before courts would admit opinion testimony based on a particular technique or discipline. This was based upon the 1923 decision *Frye v. United States 293 D 1013 (DC Cir 1923)* and as such a "general acceptance" test was established by the testimony of experts in the particular field.

In 1993, *Daubert v Merrell Dow Pharmaceuticals Inc, 113 S Ct 2786*, the US Supreme Court supersede the *Fry* test and established as requirements for the admissibility of expert evidence that:

1. The expert must be qualified.
2. The methodology employed by the expert must be reliable.
3. The testimony must assist the trier of fact.

These requirements were reflected in an amended version of US Federal Rules 702:

1. Whether the theory or technique had been tested.
2. Whether it had been subjected to peer review.
3. The rates of error in the technique and any standards controlling the technique's operation.

Whether there is general acceptance of the theory or technique in the scientific community..

2.2 The Position of the Australian Courts

In contrast to the US Federal Rule 702 which states:

"If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise"

The Australian provision for expert opinion evidence is section 79 of the *Evidence Act 1995 (Cth)* which states:

"If a person has specialised knowledge based on the person's training, study or experience, the opinion rule does not apply to evidence of an opinion of that person that is wholly or substantially based on that knowledge."

In his paper *Deflating Daubert: Gary Edmond [5]* said that "*Daubert* and more recently *Kumho*, have provided judges with more (rhetorical) resources for excluding evidence. But it also illustrates how close *Frye* and *Daubert* really are." He continues "*Daubert* is an attempt to make sure the experts have actually employed the generally accepted theory. But if a qualified or experienced expert comes to court from a recognised field using a *generally* or *significantly* accepted technique, it is hard to conceive why the issue of faithfulness to the technique or particular approach could not be explored through cross examination".

Scott Mann [6] wrote that in Australia, the *Uniform Evidence Act* allows opinion based on specialised knowledge deriving from a person's training, study or experience, leaving specialised knowledge undefined. Under the common law it is accepted that expert opinion must derive from a 'field of expertise' and points out, 'Australian law has never clearly resolved the test for a "field of expertise"'.

All of this means that the onus remains on the legal representatives to take a very active role in the expert defence of their clients' interests; to prevent bias, bribery and untruth from winning the day through their own mastery of the crucial scientific issues, vigorous critical interrogation of expert witnesses for the other side, appropriate selection and use of their own witnesses and ongoing scientific education of judge and jury.

Justice Wood [7] from the Supreme Court of New South Wales in a presentation at the 2002, 16th International Symposium for Forensic Science said "that it was unresolved in Australia whether the appropriate test for the admissibility of expert evidence should be the *Frye* or the *Daubert* test".

From what has been presented to date from both practitioners and judiciary as to what is used to determine the acceptability of evidence, that it is unclear and that a resolution of this issue has real significance if it is to be excluded from presentation as forensic evidence. The only clear thing and what we do know is that it is the role of a forensic practitioner to assist the court in understanding the facts presented in a trial and providing an opinion (if required).

2.3 Experience

As forensic practitioners we must be able to understand what we do, what we use (in our respective discipline) and how it works. We need to present our work and opinions in a scientific manner to the courts whilst being mindful that it needs to be understood by the triers of fact, often the jury.

For example: a Registered Professional Engineer and long-time State Traffic Safety, vehicular homicide expert was asked a question by the court in regards to a case based on a questionable application of critical speed formula [8].

The Court: Mr Godfrey, let's go back to some high school physics here just to complete the record. What is the scientific basis for the critical speed formula?

Mr Godfrey: Newton's Laws.

The Court: Which is?

Mr Godfrey: Well there are three of them, three different Laws

The Court: Put them on the record, please.

Mr Godfrey: You're pressing me, your Honor, here in my advanced senility.

The Court: I just want to complete the record.

Mr Godfrey: There's three Newton's Laws. For every force there is an opposing force.

The Court: An object in motion stays in motion?

Mr Godfrey: An object in motion tends to stay in motion. If it's in a circular motion, it will tend to move to the outside.

The Court: And these are the basis of the mathematics of the formula?

Mr Godfrey: These are the basics of the mathematics of the formula, yes, sir.

Clearly the evidence was erroneous because Newton's three (3) Laws are [9] :

1. Every object persist in its state of rest or uniform motion in a straight line unless it is compelled to change that state by forces impressed on it to it.
2. Force is equal to the change in momentum per change in time. For a constant mass, force equals mass times acceleration.
3. For every action there is an equal and opposite reaction.

From the above either the expert witness was so confident, that the court would accept his testimony because he was called an expert or he made a mistake that as an expert witness. What the scientific community was liable to draw was there was a lack of understanding of the basics. Worse still a jury was liable to be misled by the testimony.

As practitioners we need to know/understand the technology and methodologies that we use in our field of specialisation, and be prepared to apply them even to matters such as cold cases or when fresh information emerges in current cases.

2.4 Science

Most practitioners use some form of science to support their finding. But it is very rare to find a case where only science has been used to obtain a conviction.

In a paper by Wendy Abraham [10] she cites R v Rowe in dismissing an argument that a verdict was unsafe on the basis that DNA was the only evidence of identification, the three presiding judges Bleby J, Doyle CJ and Gray J all agreed, with Justice Bleby's conclusions: "The evidence was the subject of expert opinion. It was subjected to close scrutiny by the trial judge who directed the jury that they must be satisfied beyond reasonable doubt as to the reliability and accuracy of the DNA analysis". It probably founded a safer basis for a conviction that the frailty often attending the evidence of a single eye-witness who gives evidence of identification of the offender.

2.5 Science and No Experience

In the Court of Criminal Appeal in New South Wales [11], Mr Gordon Wood had his conviction for the murder of Carolyn Bryne on 7 June 1995 overturned. Wood had been convicted in 2008 of the murder of Byrne some 11 years earlier. The prosecution contended that Wood had thrown Byrne from a cliff. It had initially been assumed that she had committed suicide.

Associate Professor Rod Cross took an interest in how Byrne met her death: Originally it had been assumed that she committed suicide by throwing herself off a cliff and landing on rocks below; to test that theory Cross conducted a series of experiments. These involved strong men throwing women into swimming pools and throwing dead weights; further having fit and able-bodied young women jumping and diving into pools. It was concluded that a strong, fit man could have thrown a woman of Byrne's weight from near a bend in a safety fence to where her body was found

Once Cross had reached this conclusion, it was decided to prosecute the applicant for murder. The prosecution reasoned that this evidence, together with the evidence of another witness, was sufficient to exclude the possibility that Byrne committed suicide and to implicate Wood in her murder. Later Cross wrote a book *Evidence for Murder: How physics convicted a killer*. In his book he admits that he has never investigated a cliff fall but his experience was in the study the physics of sport, falling fatalities and accidents. (Note: His book about the matter was tendered and admitted as new evidence on the appeal).

Wood's appeal barrister Tim Game SC presented nine grounds of appeal, which included evidence that forensic material presented at the trial was flawed. .

Chief Justice McClellan in his finding stated "Experts who venture 'opinions', (sometimes merely their own inference of fact), outside their field of specialised knowledge may invest those opinions with a spurious appearance of authority, and legitimate processes of fact-finding may be subverted." He also mentioned the following regarding Cross' expertise in the matter;

- Cross was allowed, without objection, to express opinions outside his field of specialized knowledge.
- It was submitted to this Court that at the very least A/Prof Cross' lack of expertise in these areas diminished the weight that could reasonably be attributed to his evidence.
- Cross' qualifications are in physics and his primary area of expertise is in plasma physics.
- He has spent some time since his retirement assisting the police in the investigation of incidents of persons falling and has published alone, or with others, some papers concerned with the physics of sport.
- In the course of these tasks he has applied his knowledge of basic physics.
- He has no qualifications or experience in biomechanics.

2.6 Science and Experience

In the case of a *The State of WA v Marteniz* [12] before Justice Heenan the accused were charged with causing the death of Phillip Walsham who, it was said, was pushed from an overhead footbridge to the ground below in the early hours of 28 February 1998. Heenan was made comment on whether the evidence of an expert witness could be admitted and pointed out a number of flaws, for example:

1. There was no attempt made to standardise the results and there was no error analysis. Heenan observed that all of the measurements actually relied upon (height, velocity, weight) were fixed or precise and not within a range: There was no allowance for error. Therefore they produced precise results that could not impress even a lay observer as being particularly scientific.
2. The calculations as to time for the fall and distance covered were expressed in terms of absolute accuracy with no allowance for error. The Court observed that the situation was most unlikely given the subjective nature of much of the data and rendered questionable conclusions based on a difference between 3.7 metres and 5 metres over the short span of the fall.

Although Heenan J was critical of the evidence of the expert witness Heenan J was satisfied that the expert witness had training, experience and expertise in the field of physics, mechanics and trauma analysis and he presented his report and findings in a manner that was acceptable to the Court and allowed the evidence presented to be challenged and questioned.

2.7 Discussion

Our evidence is being tested by other experts, challenged by researchers and the law and it is the forensic practitioner who needs to keep abreast of what is happening. The case you used your science and/or knowledge to determine an opinion, may have changed. In a new case or due to the length of the legal process (the same case) your workings, finding and opinion may change due to new science or experience and this must be reflected in your work and findings as developments occur.

In the above we have seen how courts have accepted (or not) expert evidence. In the cases where an appeal has been accepted due to inadequate evidence, we must also consider that to get to an appeal, there must have been a conviction. It is not the intent of this paper to discuss the issue of why it was accepted.

We have seen how courts have accepted evidence from both the scientific and the experienced practitioner but Doyle CJ [12] stated that experience teaches us that witnesses can be "100 percent certain", yet wrong. So long as juries determine the issue of guilt, jurors will be entitled to reject the confident testimony of lay and scientific witnesses, especially if it does not fit other evidence that they do accept.

So what should the practitioner and the legal profession be looking for in the capability of a forensic practitioner to prepare and present forensic evidence?

Judge Richard Posner [13] declared that the continued rapid advance in science is going to make life difficult for judges (and the Courts) this was because of the breakneck technological changes that are thrusting many difficult technical and scientific issues on judges, for which very few of them are prepared because of the excessive rhetorical emphasis of legal education and the weak scientific background of most law students.

Justice Kirby [14] also supported the notion that technologies themselves have now gone beyond the understanding of ordinary citizens, even highly educated ones, and it is essential that society should be able to look to experts in the technology to help in defining, and responding to, the implications for society of the technological advances.

From what has been presented we know that the courts are the gatekeeper of what can be admitted as evidence but we are

still not assured of ensuring the accuracy of the evidence. In an article by the Australian Law Reform Commission [15] they mention that human failure is more likely to cause science to fail on the courtroom and automated equipment and better methodologies are available.

So the question is raised again how can we ensure that 'expert evidence is of high quality'?

In a speech to the Federal Court/Law Council Case Management Workshop Justice French [16] stated "The subject matters upon which courts are required to make decisions inevitably attract many different kinds of "expertise" which it is claimed will assist them in their determinations. Their varieties are distinguished by more than subject matter. Differences in conceptual foundations and methodology and the nature of the intellectual or other enterprises they represent raise a question about the proper construction to be given to such phrases as "specialised knowledge based on training, study or experience" which appears in s76 of the *Evidence Act 1995* (Cth).

Therefore a forensic practitioner (or expert) must be able to demonstrate their "specialised knowledge" and "expertise" to the satisfaction of a court and this is done by presenting their training, study and experience in their specialised field, as depicted in *The State of WA v Marteniz* [12].

In the UK in the cases of *RvWeller* [17], the appeals court judgement stated "that if one tries to question science purely by reference to published papers and without the practical day-to-day experience upon which others have reached a judgement that attack is likely to fail, as it did in this case". The three Justices continued that they do hope that the courts will not be troubled in future by attempts to rely on published work by people who have no practical experience in the field and therefore cannot contradict or bring any useful evidence to bear on issues that are not always contained in scientific journals.

The appeal was based on the proposition that the evidence (DNA) was not sufficiently reliable for experts to express an evaluation of the probabilities due to the lack of relevant publications. In the judgement it was stated "It is unrealistic to examine a field of science of this kind by reference to published sources. A court in determining whether there is sufficiently reliable scientific bases for expert evidence... will be entitled to take into account the experience of experts".

Even in the UK, courts are making comments and decisions on science and experience as to what is more relevant.

From what has been discussed to date, it is acknowledged that appropriate Science and Experience of the area of expertise that is being relied upon is required and as Abraham [10] states "Only then can the strength and limitations of evidence be properly assessed, and if required, presented to a jury in an accurate and comprehensible manner with its true significance being exposed".

3 Conclusion

Science and technical advancement is providing the Forensic Practitioner with better tools to work with to undertake work. This also means that the Forensic Practitioner is required to have a greater understanding of their particular area of expertise. The increasing complexity of some evidence demands that Forensic Practitioners assist the courts in understanding certain events; gone are the days where once the Forensic Practitioner could say "trust me I am an expert" without demonstrating to the satisfaction of their client and ultimately the court.

The Forensic Practitioner plays a decisive role in only a minority of cases that come before the courts; however, if required, they can have a crucial bearing on the outcome of the trial, as in *Wood v R 2012* [11]. Of concern to the courts is that a sound judgement is reached that is based upon 'the facts'. To reach this conclusion it may be the acceptance of the 'expert' due to their scientific and/or experience on the subject matter.

Forensic Practitioners must demonstrate good understanding of their area of specialisation and this may include science, technology and law they use, whether it be old (but still accepted) or new and revised. Additionally their underpinning knowledge and experience is paramount to the case, client and court, as it compliments, the science.

We are not saying that you have to have both, but from the cases provided and the publication presented the two go hand in hand.

Science and Experience, what is more relevant? Evidence and the Courts depend upon the establishment of a reliable basis of fact. So why not both, because at the end of a trial, at the end of an appeal, a Judge or a Jury will be compelled to reduce a complex slice of human experience with all its subtlety, to what is, in essence, a one line answer: "I believe you, or I don't."

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