

KEEPING BAD SCIENCE OUT OF THE COURTROOM - CHANGES IN AMERICAN AND AUSTRALIAN EXPERT EVIDENCE LAW

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I. INTRODUCTION

The rules relating to the admission into evidence of expert opinion remain unsettled in Australia. While there have been High Court decisions dealing with expert evidence, they have not comprehensively established the applicable principles. It is possible to state a number of traditional propositions of law, but the ambiguous language of these propositions entails a considerable penumbra of uncertainty and disguises a substantial area of judicial discretion. On occasion, this has resulted in the admission of evidence of questionable reliability. In the criminal jurisdiction, a number of apparent miscarriages of justice have been linked to the admission of such evidence.¹

Two developments will necessitate a careful review of the law in this area. The first is the 1993 decision of the United States Supreme Court in *Daubert v*

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1 See for example M Brown and P Wilson, *Justice and Nightmares: Successes and Failures of Forensic Science in Australia and New Zealand*, NSWUP (1992); J Bourke "Misapplied Science: Unreliability in Scientific Test Evidence" (1993) 10 *Australian Bar Review* 123 at 183.

*Merrell Dow Pharmaceuticals*² (“*Daubert*”) which has revolutionised the approach to the admissibility of expert evidence in that country. Recent decisions in a number of other jurisdictions appear to have adopted a similar approach to that taken by the United States Supreme Court. The second important development is the enactment of the *Evidence Act 1995* (Cth) and the *Evidence Act 1995* (NSW) (“the uniform evidence legislation”) which incorporates deceptively simple provisions with respect to expert evidence. The legislation is similar in content to the United States Federal Rules of Evidence upon which the decision in *Daubert* was based and it is likely that pressures to follow the American approach will be considerable.

Of course, *Daubert* has no direct application to Australian law. Nevertheless, it is time to attempt a rationalisation of the existing common law rules. Some degree of flexibility is inevitable, even appropriate, for the rules in this area of evidence law. What is less acceptable, at least in the context of criminal prosecutions, is a structure of rules and discretions that admits evidence lacking reliability, particularly in circumstances where it nonetheless appears persuasive.

II. THE TRADITIONAL POSITION

In what is sometimes referred to as the leading Australian decision on expert evidence, *Clark v Ryan*, Dixon CJ adopted the following proposition:

[T]he opinion of witnesses possessing peculiar skill is admissible whenever the subject matter of inquiry is such that inexperienced persons are unlikely to prove capable of forming a correct judgment upon it without such assistance, in other words, when it so far partakes of the nature of a science as to require a course of previous habit, or study, in order to obtain a knowledge of it.³

This passage is significant for a number of reasons. It suggests that any area of expertise sought to be relied on in the courtroom must comply with ‘scientific’ principles. On the other hand, it does not attempt to indicate what those principles are. Expertise largely depended on “a course of previous habit, or study”. For a time, this was interpreted to mean that academic qualifications were necessary. More recent judgments have made it clear that practical experience may be a basis of expertise.⁴ Whatever the source of expertise, the High Court left undefined, and therefore unexamined, the “nature of science”.

Over the years, the courts developed a number of rules to resolve the admissibility of expert opinion evidence.⁵ What may be termed the traditional position can be summarised as follows:

- it must derive from a ‘field of expertise’;
- the witness must be an expert in that field;
- the opinion must be relevant to a fact in issue;

2 61 USLW 4805 (1993). Decided on 28 June 1993.

3 (1960) 103 CLR 486 at 491.

4 See for example *R v Rose* (1993) 69 A Crim R 1 at 9.

5 Of course, experts can give evidence other than opinion evidence - they can give evidence of their own observations, if relevant.

- the opinion must not be in respect of a matter of “common knowledge”;⁶
- the opinion must not be in respect of an “ultimate issue”;⁷
- the expert must disclose the facts (usually assumed) upon which the opinion is based;⁸
- the facts upon which the opinion is based must be capable of proof by admissible evidence;⁹
- evidence must be admitted to prove the assumed facts upon which the opinion is based;¹⁰ and
- if adduced against a criminal defendant, the evidence must be more probative than prejudicial (with the burden of proof on the defence).

There are several difficulties with this traditional analysis. For example, the “common knowledge” limitation would, if strictly applied, exclude expert opinion evidence if there is a lay “common sense” perspective on the issue, no matter how wrong that perspective might be. As a result, other formulations of this test ask whether the lay perspective is likely to be “correct”.¹¹ Put differently, they ask whether the expert testimony would “assist” or “help” the lay tribunal.¹² Nevertheless, the common knowledge test does articulate an important consideration - if a lay tribunal is in a good position to make the relevant determination without expert assistance, the danger that they will unnecessarily defer to an expert supports the view that such evidence should not be admitted.¹³

Similarly, the ultimate issue test is problematic because, on many occasions, experts are permitted to express opinions on what are undeniably ultimate issues¹⁴ because such evidence is helpful in the particular case.¹⁵ Again, however, the test does articulate important considerations:

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- 6 See for example *R v Ashcroft* [1965] 1 Qd R 81 at 85; *McEndoo* (1980) 5 A Crim R 52 at 54; *Smith v R* (1990) 64 ALJR 588.
 - 7 *Transport Publishing Co Pty Ltd v Literature Board of Review* (1956) 99 CLR 11 at 127; *Clark v Ryan* note 3 *supra* at 490-92 per Dixon CJ and Windeyer J; *R v Ashcroft* *ibid* at 85; *R v Tonkin* [1975] Qd R 1; *Darrington and McGauley* (1979) 1 A Crim R 124 at 133.
 - 8 *Bugg v Day* (1949) 79 CLR 442 at 462 per Dixon J; *Fowler* (1985) 39 SASR 440; *Lewis v R* (1987) 88 FLR 104 at 124; *Arnotts Ltd v Trade Practices Commission* (1990) 24 FCR 313 at 348.
 - 9 *Ramsay v Watson* (1961) 108 CLR 642 at 649; *Paric v John Holland (Constructions) Pty Ltd* (1985) 59 ALJR 844 at 846; *Steffan v Ruban* [1966] 2 NSWLR 623 at 626, 630-1; *Pownall & Ors v Conlan Management Pty Ltd* (unreported, Supreme Court of Western Australia, Full Court, 15 March 1995).
 - 10 See *Perry* (1990) 49 A Crim R 243.
 - 11 See the passage from Dixon CJ in *Clark v Ryan* note 3 *supra* at 491, quoted above. See also *Casley-Smith v Evans & Sons Pty Ltd [No 1]* (1988) 49 SASR 314 at 320 per Olissson J; *R v Runjanic* (1991) 56 SASR 114 at 121 per King CJ.
 - 12 *Murphy v R* (1989) 167 CLR 94 (particularly at 127 per Deane J and at 130 per Dawson J); *E v Australian Red Cross Society* (1991) 31 FCR 299; *Hoogwerf* (1992) 63 A Crim R 302 at 314 per Walsh J.
 - 13 This explains the reluctance to allow expert evidence on such issues as the credibility of a witness, the ordinary meaning of words and whether a person has acted ‘dishonestly’. See particularly *Smith v R* note 6 *supra*.
 - 14 For example, on issues such as whether a criminal defendant was ‘insane’, the value of certain premises and whether a civil defendant was ‘negligent’ according to relevant standards.
 - 15 Several members of the High Court in *Murphy v R* note 12 *supra* doubted or expressly rejected the existence of the rule (at 110 per Mason CJ and Toohey J, at 126-7 per Deane J). See also *Milirrpum v Nabalco Pty Ltd* (1971) 17 FLR 141 at 165; *Thannhauser v Westpac Banking Corporation* (1991) 104 ALR 485 at 487; *Cameron v R* (1990) 2 WAR 1.

- the more central the issue upon which the expert is testifying, the greater the concern over the possibility that a lay tribunal will defer to the expert;
- many ultimate issues are of the sort where expert evidence is unlikely to be particularly helpful;
- expert witnesses are not permitted to express opinions on the application of legal standards;¹⁶ and
- expert witnesses are not permitted to express an opinion on the basis of an unstated assumption of fact which is disputed and must be determined by the tribunal.¹⁷

The courts have always had to balance a desire to admit relevant expert evidence against the dangers that it may be given excessive importance by the tribunal of fact or mislead the court in some other way. The primary concern has been with juries, as distinct from judges sitting without a jury. In this context, Dawson J has listed some of the dangers with expert evidence:

Although the modern attitude towards expert evidence is, perhaps, less exclusionary than in the past, it is nevertheless still important to recognise the dangers of wrongly admitting it. The admission of such evidence carries with it the implication that the jury are not equipped to decide the relevant issue without the aid of expert opinion and thus, if it is wrongly admitted, it is likely to divert them from their proper task which is to decide the matter for themselves using their own common sense. And even though most juries are not prone to pay undue deference to expert opinion, there is at least a danger that the manner of its preparation may, if it is wrongly admitted, give to it an authority which is not warranted. In addition the calling of unnecessary expert evidence tends to prolong a trial, particularly when it provokes the calling of further expert evidence in reply. Moreover, there is then a risk that the focus of the trial will shift from the evidence of the facts in dispute to the conflict between the competing theories of the various expert witnesses.¹⁸

Traditionally, the courts have tended to err in favour of exclusion of expert evidence in jury trials, utilising such rules as the common knowledge rule and the ultimate issue rule for this purpose. However, it is clear that the recent trend of Australian law is, as it has been overseas, for a more flexible approach which shows greater confidence in lay tribunals.¹⁹ The issue is whether this trend entails a greater risk of miscarriage of justice, particularly in criminal prosecutions.

III. THE RISK OF A MISCARRIAGE OF JUSTICE

In *Justice and Nightmares* Malcom Brown and Paul Wilson discuss a number of miscarriages of justice in Australian history which appear to have been the result of highly questionable expert evidence.²⁰ Perhaps the most famous example in recent Australian history of serious concerns about the admission of expert

16 *Chayna* (1993) 66 A Crim R 178. See also *R v Tonkin* [1975] Qd R 1 at 42-3; *R v Palmer* [1981] 1 NSWLR 209.

17 See *Arnotts Ltd v Trade Practices Commission* note 8 *supra*.

18 *Murphy v R* note 12 *supra* at 130-31.

19 See I Freckleton, "Expert Evidence and the Role of the Jury" (1994) 12 *Australian Bar Review* 73.

20 Note 1 *supra*.

evidence was the trial of Lindy and Michael Chamberlain. Their baby daughter, Azaria, disappeared from a tent in the camping area near Ayers Rock on 17 August 1980. Her body was never found. The claim by the Chamberlains that she was taken by a dingo came under challenge from a number of experts who argued that the available evidence established facts which suggested that Mrs Chamberlain had murdered her daughter and that Mr Chamberlain helped in disposing of the body. A trial based almost entirely on the testimony of expert witnesses resulted in the conviction of the Chamberlains in 1982 and subsequent appeals were unsuccessful. But doubts persisted. The evidence of the prosecution experts was challenged and new evidence was obtained. A Royal Commission set up to inquire into the case concluded that the evidence fell “far short of proving that Azaria was not taken by a dingo. Indeed, the evidence affords considerable support for the view that a dingo may have taken her.”²¹ The Chamberlains were pardoned.

The Royal Commissioner, Morling J, concluded that it was the expert evidence at the trial which caused the miscarriage of justice.²² He expressed observations on why some of the most damaging of the trial evidence was “either wrong or highly suspect”:

- “some experts who gave evidence at the trial were over-confident of their ability to form reliable opinions on matters that lay on the outer margins of their fields of expertise”;
- “some of their opinions were based on unreliable or inadequate data”;
- “other evidence was given at the trial by experts who did not have the experience, facilities or resources necessary to enable them to express reliable opinions on some of the novel and complex scientific issues which arose for consideration”;
- “the failure of the defence to put in issue some of the scientific opinions at the trial may have been due, in part, to lack of access to the necessary expert witnesses”.²³

To some extent, these concerns are being addressed. Australian courts have often restated the basic rule that an expert may testify only with respect to those matters on which he or she is truly expert.²⁴ There has been reasonably strict enforcement of those rules which relate to the factual basis of the expert opinion. As Gleeson CJ stated in *Perry*, “since opinion evidence involves the drawing of

21 *Royal Commission of Inquiry into the Chamberlain Convictions* (Commissioner, Justice TR Morling) Commonwealth Parliamentary Paper No 192 (1987) p 338.

22 Perhaps the most significant of the problems which his Honour identified was the evidence of a forensic biologist who testified that immuno-chemical tests (using an antio-foetal haemoglobin anti-serum) on material taken from the Chamberlains’ car demonstrated the presence of a significant amount of blood from a baby. Justice Morling found that difficulties posed by the age of the red material in the car and the temperatures to which it had been exposed, difficulties of which the forensic biologist was not aware, raised considerable doubts as to the reliability of her results. He also found compelling evidence demonstrating that the alleged blood was in fact sound deadening compound. He concluded that only a very small quantity of blood was in the car, if any, for which there was an innocent explanation.

23 Note 21 *supra* at 340-41.

24 See for example *Peisley* (1990) 54 A Crim R 42 at 52 per Wood J; *Darrington and McGauley* note 7 *supra* at 380; *R v Lucas* [1992] 2 VR 109.

inferences and conclusions from facts, the admissibility of such evidence depends upon proof or admission of the facts upon which the opinion is based".²⁵ On the other hand, it is strongly arguable that the courts should do more to test the reliability of data introduced into evidence and used to form the basis for crucial expert opinions.²⁶ Equally, more can be done to assess the reliability of the area of expertise from which the opinion is derived.

As noted above, one of the preconditions to admissibility of expert opinion evidence is that it must derive from a 'field of expertise'. That term refers to the area of knowledge from which the opinion is derived.²⁷ It is an issue which has usually arisen in respect of novel kinds of scientific evidence. Australian law has never clearly resolved the test for a 'field of expertise'. The High Court has never authoritatively ruled on the issue. It is likely that the recent United States Supreme Court decision in *Daubert* which deals with this issue will influence the development of the law in this country.

IV. *DAUBERT v MERRELL DOW PHARMACEUTICALS*²⁸

The question which the Supreme Court was required to determine was whether the test formulated in the famous 1923 decision of *Frye v United States*²⁹ ("*Frye*") had been superseded by the Federal Rules of Evidence, which were approved in 1975. *Frye*, which decided that a defendant in a murder trial was precluded from offering results from a precursor of the lie detector as exculpatory evidence, contained the following much-quoted statement:

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 evidentiary force of the principle must be recognised, and while courts will go a long way to admitting expert testimony deduced from a well-recognised 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 to which it belongs.³⁰

That statement was transmuted into a 'general acceptance' rule, which meant that expert evidence should not be deemed admissible unless and until the methods and principles on which it was based achieved widespread acceptance in the relevant discipline. This became a short-cut decision rule that allowed judges to avoid having to fully understand the proffered scientific evidence and, instead, admit evidence on the basis of whether it was generally accepted within the relevant field of study.

25 Note 10 *supra* at 249; see also *Ramsay v Watson* note 9 *supra*; *Paric v John Holland (Constructions) Pty Ltd* note 9 *supra*; *Fizzell* (1987) 31 A Crim R 213.

26 See J Bourke note 1 *supra*.

27 It may be a very broad area of knowledge (for example, psychiatry) or a very narrow area of knowledge (for example, the study of the phases of the moon).

28 An earlier version of this portion of our paper appeared in *Judicial Review*, published by the NSW Judicial Commission, and is used here with permission.

29 293 F 1013, DC Cir, 1923.

30 *Ibid* at 1014.

This apparently conservative principle was adopted throughout the United States federal court system, as well as in a majority of State courts. In application, however, the *Frye* rule was not often applied in civil matters, and its application in the so-called 'soft' or social science areas was always problematic. Many judges took the view that only in criminal matters should the rule be applied rigorously, and that the rule was not as applicable in the social and behavioural science areas.³¹ Certainly, the *Frye* rule had its critics, for it seemed a barrier to novel scientific ideas being offered in evidence, even if they were sound. Almost by definition, such new ideas and results based on such ideas were often precluded from being discussed in front of juries in the United States, especially in criminal matters, and in some civil actions involving the so-called 'hard' sciences.³²

When the United States Federal Rules of Evidence were approved in 1975 the issue was inexplicably left nebulous. The Rules made no reference to *Frye*, thus leaving it to the courts to decide whether or not the general acceptance rule was still applicable to implementation of the rules relating to the issue of expert testimony.³³ The majority of courts that had adopted *Frye* continued to do so after approval of the Federal Rules, using the general acceptance test as a short-cut to understanding the substance of what was being offered. However, splits began to appear within the federal court system, with some federal courts explicitly overruling *Frye*, while others continued to apply the test. A similar inconsistent pattern developed among State courts, the majority of which were using some version of the Federal Rules of Evidence. Applications of the *Frye* test also varied within jurisdictions, with some courts using it only in criminal cases, while others applied it in some civil actions. Differences also continued in terms of the application of *Frye* to different areas of science.

31 Admission of expert evidence varied widely, with some significant inconsistencies. For instance, in major criminal matters such as the penalty phase of murder trials, evidence has sometimes been allowed concerning alleged 'future dangerousness', an area fraught with difficulty in terms of predictability, and about which there is considerable controversy among scientists in relevant fields of study. See J Monohan and L Walker, *Social Science in Law*, Foundation Press (2nd ed, 1990) pp 293-7. Thus, in these criminal cases where a life is at stake, *Frye* has sometimes not been applied. See P Giannelli, "'Junk Science': The Criminal Cases" (1993) 84 *Journal of Criminal Law and Criminology* 105. Imwinkereid, a major critic of the *Frye* rule, has noted the illogical nature of not applying the general acceptance criterion in civil matters and with the so-called 'soft' sciences: E Imwinkereid, "Attempts to Limit the Scope of the *Frye* Standard for the Admission of Scientific Evidence: Confronting the Real Cost of the Acceptance Test" (1992) 10 *Behavioural Sciences and the Law* 441. He points out that not applying *Frye* in civil matters and 'soft' sciences supposedly lowers the overall 'costs' of using the rule generally, which he thinks are too high because of its conservative nature. He makes special note of the interaction of level of proof with application of the *Frye* rule. In civil matters in the United States the level of proof required is typically 'preponderance of the evidence', a lower standard than that required in criminal matters - 'beyond reasonable doubt'. The compounding effect of a lower threshold of proof with a lower criterion for use of scientific evidence can result in unjust decisions, through the acceptance of questionable science in such cases.

32 See P Giannelli, "Forensic Science: *Frye*, *Daubert* and the Federal Rules" (1993) 29 *Criminal Law Bulletin* 428 at 432.

33 The relevant Federal Rule is Rule 702: "Testimony of Experts. If scientific, technical, or other specialised 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."

A mounting tide of criticism of the *Frye* rule and confusion about its relationship to the Federal Rules of Evidence eventually forced the Supreme Court to consider the question. It agreed to review the dismissal of a civil action in which it was alleged that an anti-nausea pregnancy drug, Bendectin, had caused birth defects in two children in the Daubert family. The case had been dismissed by the trial court, with the dismissal upheld by the Ninth Circuit Court of Appeals, solely on the basis that the plaintiffs' evidence did not meet the *Frye* standard. Thus, the case clearly presented the issue of continued viability of *Frye*.³⁴

When the case was granted certiorari many assumed that the Supreme Court would finally resolve the longstanding dispute about the status of *Frye*. This led to an outpouring of advice to the court through the mechanism of some 22 amicus briefs filed by various organisations and individuals, including a number of major national scientific and legal organisations.

On 28 June 1993 the Supreme Court issued its ruling in *Daubert*, offering a unanimous opinion that *Frye* was no longer law in the area of expert evidence.³⁵ Seven justices also agreed, in a judgment delivered by Blackmun J, to offer guidelines for use in deciding what proffered scientific evidence should be admitted in trials. While they did not set out a definitive checklist, they referred to a number of factors. The first was 'falsifiability'. In what is the key passage of *Daubert* they cite two of the most prominent philosophers of science, Sir Karl Popper and Professor Carl Hempel, both of whom define science as empirical, requiring the testing of any theories claiming to be scientific:

Ordinarily, a key question to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact will be whether it can be (and has been) tested. "Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed this methodology is what distinguishes science from other fields of human inquiry." Green at 645 (1992). See also C Hempel, *Philosophy of Natural Science* 49 (1966) ("[T]he statements constituting a scientific explanation must be capable of empirical testing"); K Popper, *Conjecture and Refutations: The Growth of Scientific Knowledge* 37 (5th ed 1989) ("[T]he criterion of the scientific status of a theory is its falsifiability, or refutability, or testability").³⁶

In addition, the majority referred to such factors as the "known or potential error rate" associated with applications of a theory, whether the findings have been subjected to peer review and publication, as well as the general acceptance of a

34 The Bendectin saga has been a long one in American legal history, which is instructive in a number of ways. See especially P Huber, *Galileo's Revenge: Junk Science in the Courtroom*, Basic Books (1991) which has contributed much to public sensitivity about the issue of questionable scientific testimony, not to mention contributing the term 'junk science' to the lexicon. Huber discusses Bendectin cases at length, citing claims of Bendectin as a teratogen as a major example of scientific fraud that has led to harm for the general public. Cases concerning Bendectin have been brought representing hundreds of individuals with a few successes at the trial level, some resulting in large damage awards (up to almost 100 million dollars in one case). Virtually all jury awards have been overturned at the appeal court level due to problems in establishing causation between ingesting Bendectin and subsequent birth defects.

35 "That austere standard absent from and incompatible with the Federal Rules of Evidence should not be applied in federal trials": note 2 *supra* at 4808.

36 *Ibid* at 4809.

science being offered.³⁷ The implications of those guidelines are profound and may truly be characterised as a revolution in American expert evidence law, if they are implemented as written.

Before discussing the specific guidelines, a few general comments should assist in understanding the meaning of *Daubert*. Firstly, the Court explicitly stated that the decision is not limited to novel scientific evidence.³⁸ This means that all scientific evidence should be looked at anew, to discern whether it can meet the criteria listed in *Daubert*. Secondly, given the widespread use of juries in the United States, the *Daubert* decision would appear to be a strong statement in favour of 'let the jury decide'. Indeed, there are comments in *Daubert* which suggest that the Court believes that juries can generally understand and apply scientific evidence, within the context of the adversarial system of justice.³⁹ The majority opinion does, however, indicate that limits must be placed on what jurors hear, if the trial judge decides that proffered testimony does not pass scientific muster.

We recognise that, in practice, a gatekeeping role for the judge, no matter how flexible, inevitably on occasion will prevent the jury from learning of authentic insights and innovations. That, nevertheless, is the balance that is struck by Rules of Evidence designed not for an exhaustive search for cosmic understanding but for the particularised resolution of legal disputes.⁴⁰

It follows that the *Daubert* decision places a considerable burden on judges to evaluate scientific evidence prior to it being presented to a jury.⁴¹ No longer can judges rely on the short-cut general acceptance rule. Instead, they must be able to discern good from bad science, which in turn means that judges must come to some understanding of the history, philosophy, and sociology of science, and of proper ways of doing science. The majority explained:

Faced with the proffer of expert scientific testimony...the trial judge must determine at the outset...whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine the fact at issue. This entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology can be applied to the facts in issue.⁴²

37 The majority opinion lists those criteria, but also points out that sound criteria have been suggested in other sources, some of which are listed, and says: "To the extent that they focus on the reliability of evidence as ensured by the scientific validity of its underlying principles, all these versions may well have merit..." *ibid* at 4809 (footnote 12).

38 "Although the *Frye* decision itself focussed exclusively on 'novel' scientific techniques, we do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence": *ibid* at 4809 (footnote 11).

39 "Respondent expresses apprehension that abandonment of 'general acceptance' as the exclusive requirement for admission will result in a 'free-for-all' in which befuddled juries are confounded by absurd and irrational pseudoscientific assertions. In this regard respondent seems to us to be overly pessimistic about the capabilities of the jury, and of the adversarial system generally": *ibid* at 4809.

40 61 USLW 4805 at 4810. Justice Blackmun also notes that Rule 403 may be used by judges to preclude relevant evidence "if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury...": *ibid*.

41 "...the Rules of Evidence - especially Rule 702 - do assign to the trial judge the task of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand": *ibid* at 4810.

42 *ibid* at 4808.

V. DEFINING 'FALSIFIABILITY'

One of the amicus briefs which was cited in the majority opinion in *Daubert* was submitted by the American Association for the Advancement of Science and the National Academy of Science in support of the respondents, Merrell Dow Pharmaceuticals. This brief was co-authored by Bert Black, who chairs the American Bar Association's Standing Committee on Scientific Evidence. He and Francisco Ayala, President of the American Association for the Advancement of Science and a member of the National Academy of Sciences, have published a recent statement containing much of the reasoning in the brief.⁴³

They note that "...scientific knowledge is unique in the systematic understanding it provides of the world within and around us..." but that most people "...do not appreciate how science works through the formulation and testing of hypotheses, nor do they understand the institutional mechanisms science has developed for sharing and evaluating results."⁴⁴ They argue that, before *Daubert*, the judiciary had failed to develop clear and consistent guidelines for evaluating scientific evidence. This had allowed "scientists to give testimony based mostly on their personal biases."⁴⁵ They concluded that the courts should hold experts to the same standards scientists themselves use in evaluating each other's work.

Science shares the characteristics of explanation and systematic organisation with other forms of systematic knowledge, such as mathematics and philosophy. But empirical science is distinguished from those other forms of knowledge by another principle: empirical testing. Because a scientific explanation must be subject to testing, it is always possible that it will be proven false. Indeed, many scientists consider falsifiability the most important characteristic separating science from other forms of knowledge. An explanation or hypothesis that cannot be subject to the possibility of rejection based on observation or experiment cannot be regarded as scientific... Testing is accomplished by preparing what should be observed if the hypothesis is correct and then seeing if the predictions accord with what is actually observed. Any meaningful test can result in the falsifying of a hypothesis and it is only when a hypothesis survives such efforts at falsification that it becomes corroborated and accepted.⁴⁶

The authors discuss some classic examples from the history of science where proper testing was done or was ignored. Mendel's careful testing of ideas derived from experimenting with breeding various types of peas became the basis for modern genetics. This exemplary work, still used as an excellent example of the scientific method, is sharply contrasted to the ideas and efforts of, among others, Lysenko in the Soviet Union in the 1930s. Lysenko, for ideological reasons, promoted a theory of genetics that assumed environmental conditions were of crucial importance and that acquired characteristics could be passed on to future generations. Lysenko's legacy was virtually to cripple the Soviet agricultural economy and destroy scientific genetics in his country. His theories achieved a

43 F Ayala and B Black, "Science and the Courts" (1993) 81 *American Scientist* 230.

44 *Ibid* at 230.

45 *Ibid*. This, they concluded, "may legitimate misunderstandings and groundless fears that can thwart progress and cause real harm... Verdicts based largely on quackery have driven some beneficial pharmaceuticals out of production and have greatly reduced research in fields such as contraception."

46 *Ibid* at 234, 236-7.

strange sort of enforced consensus for a time in the Soviet Union (and such theories would have passed a general acceptance standard, such as used under *Frye*) but the consensus did not rescue the ideas from the dustbin of history. Today, the name Lysenko is mentioned only in scorn, as an example of science at its worst.⁴⁷

VI. FALSIFIABILITY IN VARIOUS AREAS OF SCIENCE

As noted earlier, the *Frye* test had been inconsistently applied by American courts in various areas of science. They had tended to use it in criminal matters, with some notable exceptions, such as in determining dangerousness in the penalty phases of capital crimes. It is noteworthy that this exception involves conclusions from the so-called 'soft' or social and behavioural sciences. The *Frye* test was also not applied typically in cases involving use of psychologists and psychiatrists in assessing competence, such as of parents in custody battles, testamentary competence, or in a multitude of other cases in which the court deemed psychological and psychiatric testimony to be relevant. The predictive ability of such testimony is a point of major controversy in the United States, but its pervasive use has continued.⁴⁸

However, American courts had been applying, somewhat inconsistently, *Frye* type principles in some developing areas of the law, particularly in relation to the new 'syndromes' that have been promoted in the courts in the past few decades - battered child syndrome, child sex abuse syndrome, battered woman syndrome and rape trauma syndrome to name but a few. *Frye* helped to bring some order to what appeared to be the chaotic situation of new syndromes developing almost every month.⁴⁹ But American courts appear sometimes to have been influenced in their decisions by strong personal feelings and opinions as well as by media attention and public opinion regarding emotional charges such as child sex abuse.⁵⁰ This

47 Another example is the practice of bloodletting. For about two hundred years physicians believed that by drawing blood diseases could be cured. An ill patient had a vein opened and a basin of 'bad blood' was drawn, a practice that apparently killed George Washington, who was suffering from a bad cold or flu. Physicians reasoned that if a patient recovered from the bloodletting then the treatment had worked. If the patient died, then the patient was too sick to help or the bloodletting occurred too late. Such reasoning made it impossible to disprove the theory that bloodletting was helpful. The theory of bloodletting was not falsifiable.

48 See D Faust and J Ziskin, "The Expert Witness in Psychology and Psychiatry" (1988) 241 *Science* 31, which makes the point that in virtually every comparison, ordinary lay people do a better job of predicting such things as future dangerousness than do professional psychologists and psychiatrists. They also note that using "actuarial data" (by which they mean rather ordinary demographic information about race, class, gender and age) allows better predictability than does clinical data gathered by psychologists and psychiatrists on specific individuals. Faust and Ziskin's explanation of why psychologists and psychiatrists are often so prone to making exaggerated claims is insightful, even if controversial.

49 See I Freckleton, "When Plight Makes Right - The Forensic Abuse Syndrome" (1994) 18 *Criminal Law Journal* 29 at 34.

50 Examples of courts getting carried away, leaving the hard work of rectifying questionable verdicts to appeal courts, are easy to find. See the New Jersey Appeal Court Ruling overturning the conviction of Kelly Michaels, who was convicted of 115 counts of child sex abuse in a well publicised case: *State of New Jersey v Michaels* 625 A 2d 489, 1993, NJ Super. Michaels served five years in prison prior to the

paper is not the place for a detailed examination of each of the new syndromes, or of the implications of their acceptance.⁵¹ However, the implications of *Daubert* in the burgeoning area of syndrome development may be immense, for several reasons.

Firstly, some of the new syndromes have simply not been well enough developed as theories to allow the kind of definitive testing that *Daubert* seems to require.⁵² Indeed, some of the new syndromes may not be testable at all, in the sense meant by Popper. Assuming for now that a claimed syndrome is testable, then the courts implementing *Daubert's* requirements will need to evaluate carefully the methodology used in the corroborative testing done on the syndrome. Were proper control groups used? Was the instrumentation well developed and accepted in relevant disciplines? Were the statistical techniques properly applied to the data? Was the data gathered in ways that allowed preferences of the researchers to influence the results? Have there been adequate replications of the findings, or does the claim of a syndrome rest on a very narrow data base?

Secondly, many of the syndromes are based on Freudian theory. In what is easily the most sophisticated commentary on the meaning of *Daubert* for the social and behavioural sciences, Underwager and Wakefield, discuss the implications of

Appeal Court writing a scathing critique of the evidence offered at trial, including the misuse of syndrome evidence, and ordering her release. In Nevada, another well publicised child sex abuse case was overturned on appeal after a woman was sentenced to three consecutive life terms on the basis of very questionable evidence involving allegations of child sex abuse that were bolstered at trial by reference to child sex abuse syndrome. The Nevada Supreme Court opinion was quite critical of the quality of the evidence used in the conviction and vacated the conviction: *Felix and Ontiveros v State of Nevada* 849 P 2d 220, 1993 Nev. In another area of high emotion and considerable misinformation, a new syndrome of 'destructive cultism' has seen use. See J Richardson, "Cult/Brainwashing Cases and the Freedom of Religion" (1991) 33 *Journal of Church and State* 55 and "Religiosity as Deviance: Negative Religious Bias in and Misuse of the DSM-III" (1991) 14 *Deviant Behaviour* 1 and D Anthony and T Robbins, "Law, Social Science and the 'Brainwashing' Exception to the First Amendment" (1992) 10 *Behavioural Sciences and the Law* 5.

51 See the following as examples of thoughtful discussions of issues and research concerned with some major new syndromes: J Myers, "Expert Testimony Describing Psychological Syndromes" (1993) 24 *Pacific Law Journal* 1449; D McCord, "Syndromes, Profiles and Other Mental Exotica: A New Approach to the Admissibility of Non-traditional Psychological Evidence in Criminal Cases" (1987) 66 *Oregon Law Review* 19; the entire special issue on "Expert Evidence" (1989) 10(7) *Behavioural Sciences and the Law*; I Sagatun, "Expert Witnesses in Child Abuse Cases" (1991) 9 *Behavioural Sciences and the Law* 201; M Mason, "A Judicial Dilemma: Expert Witness Testimony in Child Sex Abuse Cases" (1991) *Journal of Psychiatry and the Law* 185; S Ceci and M Bruck, "Suggestibility of the Child Witness: A Historical Review and Synthesis" (1993) 113 *Psychological Bulletin* 403; T Massaro, "Experts, Psychology, Credibility and Rape: The Rape Trauma Syndrome Issue and its Implications for Expert Psychological Testimony" (1985) 69 *Minnesota Law Review* 395; D Dwyer, "Expert Testimony on Rape Trauma Syndrome: An Argument for Limited Admissibility" (1988) 63 *Washington Law Review* 1063; K Fischer, N Vidmar and R Ellis, "The Culture of Battering and the Role of Mediation in Domestic Violence Cases" (1993) 46 *SMU Law Review* 2117; R Schuller and N Vidmar, "Battered Woman Syndrome Evidence in the Courtroom" (1992) 16 *Law and Human Behaviour* 273; N Vidmar and R Schuller, "Social Framework Evidence and Jury Decision Making Processes" (1989) 52 *Law and Contemporary Problems* 133.

52 Ian Freckleton argues in a paper applying the *Daubert* decision to two new syndromes - battered woman syndrome and rape trauma syndrome - that neither will meet the rigorous criteria of *Daubert*: note 49 *supra*. Freckleton had earlier called for a very limited use of such syndromes under the *Frye* criterion: I Freckleton, "Novel Scientific Evidence" in I Freckleton and H Selby (eds), *Expert Evidence*, Law Book Company, vol 1, pp 3331-454.

the decision for Freudian-based theories.⁵³ After noting that the majority opinion makes much of the work of Sir Karl Popper, they point out that one of Popper's own best examples of unfalsifiable theories was Freudian thought. In his famous two volume opus, *The Open Society and its Enemies*, Popper demonstrates at some length the unfalsifiability of both Marxism and Freudianism.⁵⁴ Underwager and Wakefield comment:

That Freudian theory has so pervaded psychological and psychiatric theory and thought during this century illustrates the potential of the *Daubert* decision to fundamentally change what has been traditionally accepted in the field... Freudian theory uses a convoluted conceptual structure that explains all human behaviour after the fact. Adherents to Freudian psychoanalytic theory offer authoritative sounding explanations for all human behaviours, from individual quirks and slips of the tongue, to large scale social phenomena such as religion. It is unscientific because nothing can count against it. There is no point at which it is subject to falsification. This type of theory attempts to provide posthoc explanation for every possible event, however, it is incapable of predicting any particular event. A successful scientific theory, by contrast, predicts outcomes from a discrete set of events with an ascertainable degree of reliability.⁵⁵

The authors note that American psychiatry is largely Freudian in its orientation and conclude that psychiatric testimony based on such principles should now be inadmissible as scientific evidence. They point out that the *Daubert* decision may lead to questioning of the American Psychiatric Association's Diagnostic and Statistical Manual, on the grounds of lack of reliability and testability, a truly revolutionary potential consequence of *Daubert*.

Special attention is reserved in the Underwager and Wakefield paper for two areas relevant to discussion of newer psychological syndromes - cases of alleged child sex abuse and claims of 'recovered memories'. They cite a long list of specific claims that have been made to support allegations of child sex abuse, pointing out how often various claims are mutually contradictory and not subject to disproof using any kind of reasonably scientific approach to relating alleged symptoms with possible abuse in terms of causation. Similar comments are made about a list of characteristic behaviours of persons accused of child sex abuse which some claim indicate the person 'fits the profile of an abuser', or their behaviour 'is not inconsistent with the idea that the person is an abuser'. They conclude that

...what makes such testimony, and its underlying theory, not falsifiable is the fact that there is no circumstance, behaviour, or observation which could be used to conclude that the abuse did not occur...⁵⁶

The authors also discuss the issue of 'repressed memories', which has evoked great controversy in scientific and legal circles in recent years.⁵⁷ The authors note

53 R Underwager and H Wakefield, "New Paradigm in Evidence Law" (1993) 10 *Issues in Child Abuse*.

54 K Popper, *The Open Society and its Enemies*, Princeton University Press (1952).

55 Note 53 *supra* at 158-9.

56 *Ibid* at 161.

57 See E Loftus, "The Reality of Repressed Memories" (1993) 48 *American Psychologist* 518 for a thorough review of this debate. Also see S Mulhern, "Satanism and Psychotherapy: A Rumour in Search of an Inquisition" and P Jenkins and D Maier-Katkin, "Occult Survivors: The Making of a Myth", both in J Richardson et al (eds), *The Satanism Scare*, Aldine de Gruyter (1991).

that there is considerable evidence falsifying the Freudian concept of repression, and none that supports the notion with research that truly allowed falsification of the crucial repression concept. They conclude:

Faced with the massive weight of over 60 years of research that falsifies the concept of repression, a reasonable judge must rule that testimony based upon the concept is not scientific, cannot be relevant or helpful to the finder of fact, and therefore, is not admissible.⁵⁸

If practitioners in the fields of social and behavioural science continue to assert that their area is a science, they should be required to satisfy normal scientific criteria. If application of those criteria leads to a conclusion of lack of reliability, the evidence should not be admitted. On the other hand, if it is argued that such sciences are somehow different from the 'hard' sciences, they should be given the opportunity to justify non-application of the *Daubert* criteria and to explain how they can still assert reliability.

VII. IMPLICATIONS FOR LEGAL EDUCATION

In formulating the task which they considered had to be undertaken when determining the admissibility of scientific evidence, the majority in *Daubert* stated that they were "confident that federal judges possess the capacity to undertake that review".⁵⁹ This is a controversial point on which disagreement erupted among the Justices, as evidenced by Chief Justice Rehnquist's dissent to part of the *Daubert* opinion (joined by Stevens J). The Chief Justice was dismayed at the task imposed on trial judges by the majority, lamenting that it involved "matters far afield from the expertise of judges".⁶⁰ His Honour urged caution in offering abstract advice on how judges should proceed in this area, "because our reach can easily exceed out of grasp".⁶¹ He concluded:

I defer to no one in my confidence in the federal judges; but I am at a loss to know what is meant when it is said that the scientific status of a theory depends on its "falsifiability", and I suspect some of them will be, too. I do not doubt that Rule 702 confides to the judge some gatekeeping responsibility in deciding questions of the admissibility of proffered expert testimony. But I do not think it imposes on them either the obligation or the authority to become amateur scientists in order to perform that role.⁶²

Others have expressed concern about the new role defined for judges by *Daubert*. Miller, Rein and Bailey, writing in *Judicature*, observe:

To carry out the Court's purpose, each federal judge must achieve at least a basic level of scientific literacy. At a minimum, judges will have to become more conversant with the 'sociology of science', with emphasis on such concepts as 'the scientific method'; to understand the rudiments of statistics and probability theory; to obtain some appreciation of error factors and the implicit limitations of often-used means of scientific observation, measurement and detection; and to become familiar with the

58 Note 53 *supra* at 164-5.

59 Note 2 *supra* at 4808.

60 *Ibid* at 4810.

61 *Ibid*.

62 *Ibid* at 4811.

Federal Justice Centre's forthcoming reference guide intended to provide the basis for intelligent judicial inquiry of proffered experts in fields such as epidemiology and toxicology.⁶³

Underwager and Wakefield, who have been deeply involved in controversies concerning certain types of psychological testimony, are also critical of judges' abilities to discern sound scientific evidence and properly implement *Daubert*. Nevertheless, they believe that

this decision will eventually change, markedly, what is admitted as scientific evidence in all trials. The result will be nothing less than a revolutionary paradigm shift that replaces naive logical positivism with the contemporary understanding of the nature of science. ... Judges will neither readily understand [the principle of falsifiability] nor consistently apply it without training and education. Neither judges nor attorneys can acquire an adequate understanding of this paradigm shift in a few hours at a conference seminar... Proper and effective assimilation of this revolutionising construct into the justice system will require a major educational and training effort for all the players involved - scientists, attorneys, and judges.⁶⁴

As Underwager and Wakefield explain, most people seek confirmatory rather than disconfirmatory evidence for their beliefs. This 'confirmatory bias' interferes with an intuitive grasp of what is meant by the principle of falsifiability. It is very difficult for most people to address directly the idea of how theories - especially 'pet theories' in which they believe - should be tested in order to pass muster in terms of falsifiability. It is by no means certain that judges have had sufficient training to understand the principles involved in implementing the falsifiability criterion. Thus, it is imperative that attention be given to educating judges in this area, as well as adding components to legal education to ensure that future lawyers and judges are knowledgeable enough to make sound decisions when confronted with scientific questions.

VIII. IMPLICATIONS FOR AUSTRALIAN COMMON LAW

Australian law has never clearly resolved the test for a 'field of expertise'. There are authorities which appear to adopt the *Frye* test ('general acceptance'),⁶⁵ authorities which adopt the *Daubert* test ('sufficient reliability')⁶⁶ and authorities

63 P Miller, B Rein and E Bailey, "Daubert and the Need for Judicial Scientific Literacy" (1994) 77 *Judicature* 254 at 254. See also S Jasanoff, "What Judges Should Know About the Sociology of Science" (1993) 77 *Judicature* 77. Jasanoff points out that when judges attempt to discern scientific truth they are actually participating directly in the social construction of that truth. She expresses concern about judges being prepared for that role: "When judges exclude expert testimony, appoint their own expert witness, or render summary judgments, they inescapably give up the role of dispassionate observer to become participants in a particular construction...of scientific facts. They help shape an image of reality that is coloured in part by their own preferences and prejudices about how the world should work. Such power need not always be held in check, but it should be sparingly exercised.": *ibid* at 82.

64 Note 53 *supra* at 10-20, 157-8.

65 *Eagles v Orth* [1976] Qd R 313 at 320; *Carroll* (1985) 19 A Crim R 410; *Lewis v R* note 8 *supra* at 116-7 per Muirhead J; *R v Runjanic* note 11 *supra* at 119 per King CJ; *R v Lucas* note 24 *supra* at 115; *Jamieson* (1992) 60 A Crim R 68 at 77; *R v C* (1993) 60 SASR 467 at 473 per King CJ.

66 *Casley-Smith v Evans & Sons Pty Ltd [No 1]* note 11 *supra* at 320, 328 per Olsson J; *R v Runjanic ibid* at 124 per Bollen J; *R v C ibid* at 479 per Duggan J.

which adopt both tests.⁶⁷ The trend appears to be to judicial assessment of reliability. Thus, over the last decade a number of decisions dealing with survey evidence have formulated guidelines designed to ensure the reliability of the survey results as a pre-condition to admissibility.⁶⁸

In one of the leading authorities, *R v Gilmore*, Street CJ concluded that spectrographic voice analysis was a “recognised field in which a properly qualified expert can give admissible evidence”.⁶⁹ However, he also quoted with approval the following passage from *United States v Baller*:

In order to prevent deception or mistake and to allow the possibility of effective response, there must be a demonstrable, objective procedure for reaching the opinion and qualified persons who can either duplicate the result or criticise the means by which it was reached. ... Deciding whether these conditions have been met is normally within the discretion of the trial judge... Absolute certainty of result or unanimity of scientific opinion is not required for admissibility.⁷⁰

It may be that those courts which refer to the question of recognition or general acceptance are not necessarily endorsing that as the test of admissibility - it could simply be a relevant consideration, as the majority in *Daubert* recognised.

Significantly, Australian courts appear less willing to admit some of the ‘syndrome’ evidence which has been regularly admitted in American courts. One example is a 1993 decision of the Tasmanian Court of Criminal Appeal, *Ingles v R*,⁷¹ in respect of evidence of child sexual abuse accommodation syndrome.⁷² At the trial, evidence had been given by a Dr Sale about this syndrome, which as Green CJ explained in his judgment, “is a pattern of behaviour exhibited where children are subject to repetitive (sexual) abuse by someone in whom they would normally have trust”. The Court unanimously held that it should have been excluded by the trial judge. While the basis for exclusion did not turn on a determination whether Dr Sale’s evidence fell within an area of expertise, each member of the Court appeared to support a reliability analysis.

Thus, Green CJ indicated that if the evidence established that a child sex abuse complainant exhibited, “a clearly defined and unusual pattern of behaviour, expert evidence to the effect that such a pattern of behaviour is a scientifically accepted concomitant of the complainant having been the subject of such abuse might be

67 *R v Gilmore* [1977] 2 NSWLR 935 at 939, 941; *R v Lewis* note 8 *supra* at 121-4 per Maurice J.

68 *Shoshana Pty Ltd v 10th Cantanae Pty Ltd* (1987) 79 ALR 279; *Ritz Hotel Ltd v Charles of the Ritz Ltd* (1988) 15 NSWLR 158; *Interlego AG v Croner Trading Pty Ltd* (1991) 102 ALR 379.

69 Note 67 *supra* at 939.

70 *Ibid* citing *United States v Baller* 519 F 2d 463 (1975) at 466-7.

71 (Unreported, Tasmanian Court of Criminal Appeal, 4 May 1993.)

72 Underwager and Wakefield discuss this in “New Paradigm in Evidence Law” note 53 *supra*. In sharp contrast to the battered child syndrome, which does have strong empirical support and has received widespread acceptance in American courts, the CSAAS has not gained support among most scientists researching in the area as a diagnostic category. However, it has been accepted in some courts, apparently with considerable impact on jurors. In their paper, Underwager and Wakefield apply the *Daubert* criterion of ‘error rate’ to the area of child sex abuse claims and find the claims wanting in terms of the type of support that should be required to allow claims to be entered as evidence: *ibid* at 164. Other types of predictions of child sex abuse are also suspect in that they lead to an unacceptably high number of “false positives...that is identifying an individual as abused or an abused when it is not true”. See also H Wakefield and R Underwager, “The Alleged Child Victim and Real Victims of Sexual Misuse” in J Krivacska and J Money (eds), *Handbook of Forensic Sexology*, Prometheus Books (1993).

admissible".⁷³ Justice Crawford relied on the New Zealand decision of *R v Accused*⁷⁴ for the proposition that, "expert evidence of the child sexual abuse accommodation syndrome might be admitted if it established that 'a particular child had exhibited traits displayed by sexually abused children generally' and additionally if the evidence demonstrates 'in an unmistakable and compelling way and by reference to scientific material that the relevant characteristics are signs of child abuse'".⁷⁵ Most explicit was Zeeman J:

There was no evidence of characteristics or action clearly and unmistakably the concomitants of sexual abuse. The evidence of Dr Sale indicated that the conduct of the complainant was consistent with that to be expected from a child the subject of sexual abuse, but in circumstances where that conduct was equally consistent with no sexual abuse having occurred. It follows that his evidence did not indicate with any degree of compulsion that the complainant's evidence was truthful. At best it indicated that her lack of complaint ought not to be taken as an indication that she had been untruthful. Dr Sale gave no evidence of any tests conducted by him. Indeed he gave no evidence that he had ever seen the complainant.⁷⁶

It follows that *Daubert* will reinforce the trend of authorities in Australia. Of course, *Daubert* was premised on an interpretation of statutory provisions which, as yet, have no correlation in Australia. Nevertheless, the focus on reliability is likely to strike a chord in the development of the common law in this country, as it has in New Zealand.⁷⁷ More importantly, the criteria articulated by the majority in *Daubert* in assessing reliability are likely to be utilised by Australian courts.

IX. BEYOND DAUBERT

One of the issues which *Daubert* raises is the meaning of 'reliable'. It plainly does not mean 'certain'. As the majority in *Daubert* pointed out, "it would be unreasonable to conclude that the subject of scientific testimony must be 'known' to a certainty; arguably there are no certainties in science".⁷⁸ Ultimately, reliability is a question of degree. The majority hinted as much when they recognised the flexible nature of the reliability test. Guidance might be derived from their observation that "conjectures that are probably wrong are of little use". Certainly, if an expert opinion is "probably wrong" it should not be permitted. Equally, given the burden of proof on the party seeking to have the evidence admitted, it should not be permitted if the proponent of the evidence is unable to

73 Note 71 *supra* at 2.

74 [1989] 1 NZLR 714.

75 Note 71 *supra* at 2.

76 *Ibid* at 6.

77 In *R v Accused* note 74 *supra* the New Zealand Court of Appeal applied a similar analysis to *Daubert*.

78 See also *R v Gilmore* note 67 *supra* at 941 per Street CJ: "The science has developed to the point where, although by no means one hundred per cent accurate, it can properly and responsibly be used... To recognise...a degree of risk of inaccuracy and to recognise a need for caution in the use of the evidence, is far from treating the evidence as inadmissible."

demonstrate that the opinion is “probably right”.⁷⁹ But should it be permitted if the likelihood that the opinion is right is only slightly more than half?

The trend of Australian law in this area may be moving to a position which will provide a solution to this question. As was discussed earlier, Australian courts are tending to reject the strict requirement that expert opinion evidence must not be in respect of a matter of common knowledge. Thus, several members of the High Court in *Murphy v R* considered that the proper test is to ask whether the expert testimony would assist or help the lay tribunal.⁸⁰ The next step might be to treat this test as the fundamental basis of admissibility. According to such an analysis, expert opinion testimony will be admitted (assuming that its factual basis is properly established and subject to other exclusionary rules⁸¹ and discretionary exclusion)⁸² if the witness really is an expert able to supply helpful opinion evidence on an issue in the trial.⁸³

Plainly, the concept of ‘helpfulness’ or ‘assistance’ is critical. It makes it clear that the mere fact that lay persons have a common sense perspective on some issues does not necessarily mean that an expert opinion on that issue will not be permitted. In substance, this test reflects that which is imposed under Rule 702 of the United States Federal Rules of Evidence. As we have seen, the United States Supreme Court in *Daubert* interpreted those provisions to impose a test of reliability. That may be the direction in which the Australian law moves. According to this analysis, the test of admissibility would be satisfaction of a threshold requirement of reliability. Consideration of other factors may lead to discretionary exclusion, at least where the evidence is led by the prosecution in a criminal case.

This appears to be the present position in Canada. While the Supreme Court of Canada has not settled the test of admissibility for novel scientific evidence, in *R v Beland*⁸⁴ Wilson J rejected the application of the *Frye* test in Canada. Her Ladyship preferred a test considering relevance and ‘helpfulness’, which she appeared to equate with ‘reasonable reliability’.⁸⁵ While other members of the Court did not expressly adopt this approach, it has been followed by more recent Canadian decisions. Thus, in *R v Johnston*,⁸⁶ an Ontario judge ruled that “the appropriate test is whether the evidence is relevant and helpful... The key to understanding ‘helpful’ in this context lies in equating it to ‘reliable’”.⁸⁷ His Lordship held that

79 See *Straker v R* (1977) 15 ALR 103 where the High Court considered that an expert should not be permitted to express an opinion on a possible explanation for observed facts where there was no other evidence supporting that explanation and the explanation was improbable.

80 Note 12 *supra*.

81 An example of an ‘exclusionary rule’ which often operates to exclude expert opinion evidence are those which exclude evidence relevant only to the credit of a witness. See *R v C* note 65 *supra* at 473.

82 For an example of discretionary exclusion see *R v Lucas* note 24 *supra*.

83 It is important to emphasise that this test should be applied to every opinion which the expert is asked to offer.

84 (1987) 36 CCC (3d) 481.

85 *Ibid* at 506.

86 (1992) 69 CCC (3d) 395.

87 *Ibid* at 414 per Langdon J.

to assess whether novel scientific evidence is helpful, one should consider the following factors:

1. The potential rate of error.
2. The existence and maintenance of standards.
3. The care with which the scientific technique has been employed and whether it is susceptible to abuse.
4. Whether there are analogous relationships with other types of scientific techniques that are routinely admitted into evidence.
5. The presence of failsafe characteristics.
6. The expert's qualifications and stature.
7. The existence of specialised literature.
8. The novelty of the technique in its relationship to more established areas of scientific analysis.
9. Whether the technique has been generally accepted by experts in the field...
10. The nature and breadth of the inference adduced.
11. The clarity with which the technique may be explained.
12. The extent to which basic data may be verified by the court and the jury.
13. The availability of other experts to evaluate the technique.
14. The probative significance of the evidence.⁸⁸

While such a list of factors provides useful guidance, it is still arguable that it does not comprehensively articulate the concept of 'helpfulness' or 'assistance'. Rather than simply being another way of stating the reliability test, it may be more appropriate to see the issue as an exercise in balancing. There are recent decisions in Australia which suggest such an approach, one in which the test renders inadmissible an expert opinion if the benefits to be derived from the opinion are outweighed by the disadvantages associated with it. According to this approach, relevant considerations would include:

- the reliability of the particular field of expertise;
- the reliability of the application of that field of expertise to the particular issue;⁸⁹
- the reliability of the expert's opinion (taking into account the expert's qualifications, experience, facilities and resources);
- the likely capacity of the tribunal of fact to understand and assimilate the evidence, without being misled or simply deferring to the expert opinion;⁹⁰
- the likely capacity of the tribunal of fact to properly determine the issue without the benefit of the expert opinion⁹¹ (thus, counter-intuitive expert testimony is more likely to be admitted than expert testimony which confirms common sense perceptions);⁹²
- the importance of the issue to which the evidence relates;

88 *Ibid* at 415.

89 See *R v Tilley* [1985] VR 505. The Court recognised the scientific nature of stylometry but rejected evidence from an undoubted expert in the field seeking to draw inferences from the comparison of a formal communication in writing with an oral one.

90 See *R v Tran* (1990) 50 A Crim R 233 at 242-3.

91 See *Smith v R* note 6 *supra*; *Ingles v R* note 71 *supra*.

92 For example, battered woman syndrome evidence is counter-intuitive and thus more likely to assist a lay tribunal: *R v Runjanic* note 11 *supra*. In contrast, child sex abuse syndrome evidence was "not so special and outside ordinary experience that the knowledge of experts should be made available": *R v C* note 65 *supra* at 474 per King CJ.

- the likely court time utilised if the opinion is admitted;⁹³
- the danger that the focus of the trial will shift from the evidence of the facts in dispute to the conflict between the competing theories of the various expert witnesses;⁹⁴ and
- whether the evidence is being led against a defendant in a criminal trial.

The judgment of King CJ in the 1993 South Australian decision of *R v C* appears to provide a good example of this type of analysis.⁹⁵ His Honour made it clear that the critical question was whether the jury “might well be misled if they did not have the assistance of the expert evidence”. His Honour emphasised that “it is very much a matter of degree”. On the one hand, the courts have to be cautious.

Courts must exercise great caution in expanding the area of expert evidence. That caution is necessary in order to safeguard the integrity of the trial process and to protect the capacity of courts and juries to discharge their fact-finding functions from being overwhelmed by a mass of expert evidence on topics which could be judged without the assistance of such evidence.⁹⁶

On the other hand, expert evidence might prevent a jury from being misled, particularly where the conclusions deriving from the evidence are counter-intuitive. In the particular case, his Honour concluded that the benefits to be derived from expert evidence as to the typical responses of sexually abused children were not “necessary in order to enable a jury to reach a just decision or that their value would outweigh the impairment of the trial process which would result from introducing expert opinion and probably conflicting expert opinion, into child sexual abuse cases.”⁹⁷

The judgment also demonstrates that the courts take a more conservative position when the evidence is adduced by the prosecution in a criminal case - the concern to minimise the risk of conviction of an innocent person justifies the imposition of a heavy burden on the prosecution to demonstrate that expert evidence of questionable reliability should be admitted.⁹⁸

X. THE EVIDENCE ACTS 1995

On the face of it, the uniform evidence legislation makes significant changes to the existing common law in this area. While s 76 provides that opinion evidence is not admissible, s 79 provides:

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.

93 *Murphy v R* note 12 *supra* at 131 per Dawson J.

94 *Ibid.*

95 Note 65 *supra*.

96 *Ibid* at 474.

97 *Ibid.*

98 For a similar analysis see *R v Lewis* note 8 *supra* per Maurice J. See also P Giannelli, “‘Junk Science’: The Criminal Cases” (1993) 84 *Journal of Criminal Law and Criminology* 105.

Section 80 abolishes the ultimate issue rule and the common knowledge rule.

These provisions are similar, but not identical, to the United States Federal Rules, upon which *Daubert* was based. There are two obvious differences. Firstly, s 70 refers to “specialised knowledge” and not “scientific, technical or other specialised knowledge” as in Rule 702. Secondly, s 79 does not require that such “specialised knowledge” “will assist the trier of fact” as stated in Rule 702.

The first difference may resolve one of the uncertainties which arises from *Daubert* - the applicability of the majority’s approach to different fields of knowledge. It may be that the criteria articulated in *Daubert* should not be applied to other fields of knowledge. However, the Rule 702 formulation of “scientific knowledge” may make this difficult.⁹⁹ A test of “specialised knowledge” gives the courts sufficient flexibility to deal with this problem. The second difference may be more troubling. The *Daubert* majority relied on the Rule 702 requirement that expert evidence “will assist the trier of fact” in order to conclude that a precondition to admissibility of expert evidence is a valid scientific connection to the inquiry. However, as the majority themselves noted, this is really an aspect of relevance - expert testimony which is not “sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute” is not sufficiently relevant. It follows that the omission of the requirement of ‘assistance’ in s 79 does not matter, so long as the requirement of reliability is derived from the words “specialised knowledge”.

This raises a different problem. The Australian Law Reform Commission, originally responsible for the drafting of s 79, appears to have considered that issues of reliability of the sort discussed in *Daubert* will be dealt with on a discretionary basis by the trial judge. Section 135 of the legislation provides:

The court may refuse to admit evidence if its probative value is substantially outweighed by the danger that the evidence might:

- (a) be unfairly prejudicial to a party;
- (b) be misleading or confusing; or
- (c) cause or result in undue waste of time.

While this provision does provide a mechanism for the balancing exercise which we discussed above, it would be unsatisfactory if these issues were simply left to discretion, because it places the onus on the party seeking exclusion. In most cases, the burden should be on the party seeking to have the evidence admitted to demonstrate its reliability. However, in our view, the requirement of “specialised knowledge” in s 79 should be interpreted to impose a standard of evidentiary reliability (albeit not necessarily according to ‘scientific’ criteria). As the majority in *Daubert* themselves pointed out,

[T]he word ‘knowledge’ connotes more than subjective belief or unsupported speculation. The term “applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds”... Proposed testimony

99 In his partially dissenting judgment Rehnquist CJ raised this problem. However, the majority responded by simply saying: “Our discussion *supra* is limited to the scientific context because that is the nature of the expertise offered here”: note 2 *supra* at 4808 (footnote 8).

must be supported by appropriate validation - ie "good grounds", based on what is known.¹⁰⁰

On this analysis, if the expert testimony does meet that standard of evidentiary reliability and relevance it is admissible, subject to discretionary exclusion on the balancing of the various considerations to which we have referred.

However, such an analysis may not be adopted by Australian courts. In the light of that, it would be preferable if the legislation were amended to include specific criteria for determining the admissibility of scientific evidence. In this way, we would avoid the quandary faced by American courts when the Federal Rules of Evidence were approved with no reference to *Frye*. More importantly, legislative adoption of such criteria would encourage the judiciary to keep bad science out of their courts.

XI. CONCLUSION

Daubert represents a potential revolution in expert evidence law in the United States, in that it institutes rigorous criteria for ascertaining whether testimony claimed to be scientific is accepted as such by the courts. However, those criteria are unlikely to be well understood or appreciated by many in the legal profession, requiring considerable effort in legal education. Once understood and applied, much expert opinion evidence which is presently admitted by the courts will come under renewed scrutiny. Australian courts are already engaged to some extent in the difficult task of distinguishing 'good' from 'junk' science. Overseas developments will hasten that process, as will the enactment of the uniform evidence legislation. To the extent that past miscarriages of justice have flowed from inadequate judicial review of controversial 'expert' evidence, such a development can only be encouraged.

100 *Ibid* at 4808.