

DEFLATING DAUBERT: KUMHO TIRE CO v CARMICHAEL AND THE INEVITABILITY OF GENERAL ACCEPTANCE (FRYE)

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I. INTRODUCTION

The United States Supreme Court recently considered the standard for the admissibility of non-scientific expert opinion evidence in a product liability case involving expert engineering testimony. In ascertaining the appropriate standard, the Supreme Court was asked to determine the relevance of the seminal decision of *Daubert v Merrell Dow Pharmaceuticals Inc.*¹ In *Daubert*, a majority of the Court had endorsed 'relevance and reliability' as the main determinants of the admissibility of scientific opinion evidence. The relevance of *Daubert* was raised due to a disagreement between the parties and among the lower courts over the scientificity of engineering and the admissibility standards applicable to non-scientific testimony. For the majority in *Daubert*, the reliability, and therefore the admissibility, of scientific evidence could ordinarily be linked to the flexible application of a range of enumerated criteria. *Kumho Tire Co v Carmichael*² brought into focus the relevance of the specific *Daubert* criteria and whether the standards encouraged in *Daubert* should apply to non-scientific evidence. Specifically, the Court addressed the standard for the admission of "technical and other specialized knowledge" under the United States Federal Rules of Evidence (1975) ("FRE").

Rule 702 of the FRE states:

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1 509 US 579; 125 L Ed 2d 469; 113 S Ct 2786 (1993). *Daubert* has fostered its own mini-industry. See, for example, G Edmond and D Mercer, "Keeping 'Junk' History, Philosophy and Sociology of Science out of the Courtroom: Problems with the Reception of *Daubert v Merrell Dow Pharmaceuticals Inc*" (1997) 20 *UNSWLJ* 48.

2 526 US 137; 143 L Ed 2d 238; 119 S Ct 1167 (1999).

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.³

The Court in *Daubert* had considered whether the older common law rule in *Frye v US*⁴ was encapsulated in the enactment of the FRE. The *Frye* or 'general acceptance' test, originally related to novel proffers of scientific evidence, had come to stand for the proposition that only testimony based on generally accepted techniques or principles could be admitted into courts.⁵ Over the years, especially after 1975, the general acceptance test had been modified, qualified and even rejected among the federal circuits.⁶ In *Daubert*, the entire Supreme Court agreed that *Frye* had been overruled by the enactment of the FRE. The majority proceeded to develop a new standard to replace *Frye*.

In addressing the admissibility standard for scientific evidence, the *Daubert* majority placed a strong emphasis upon reliability, the centrality of the scientific method, and a particular, if somewhat eclectic, image of science reflected in four 'key' criteria. Emphasising flexibility, the majority provided the following as guides to the reliability of scientific evidence:

- whether a theory of techniques can be or has been tested (citing Popper and Hempel);⁷
- whether a theory of technique has been subjected to peer review and publication (citing Jasanoff and Ziman);⁸

3 The 'equivalent' Australian provision for expert opinion evidence is section 79 of the *Evidence Act 1995* (Cth): "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."

4 293 F 1013 (1923).

5 *Ibid.* *Frye* was generally portrayed as a restrictive standard because the approach or technique had to be already 'generally accepted' before it could be admitted. There was a tendency to associate *Frye* with methods rather than the conclusions they generated: K Chesebro, "Taking *Daubert*'s 'Focus' Seriously: The Methodology/Conclusion Distinction" (1994) 15 *Cardozo Law Review* 1745. This distinction was reflected in *Daubert v Merrell Dow Pharmaceuticals Inc* note 1 *supra* at 595, but has proven difficult to maintain in practice and was qualified in *General Electric Co v Joiner* 139 L Ed 2d 508 at 519 (1997). Compare *US v Bonds* 12 F3d 540 at 556 (6th Cir 1993) and *Claar v Burlington Northern R Co* 29 F3d 499 at 501 (9th Cir 1994) with *Hall v Baxter Healthcare Corp* 947 F Supp 1387 (D Or 1996). See also *Lust v Merrell Dow Pharmaceuticals Inc* 89 F3d 594 at 598 (9th Cir 1996); *In re Paoli RR Yard PCB Litigation* 35 F3d 717 at 743-5 (3rd Cir 1994).

6 The majority of circuits held that *Frye* governed the admissibility of expert testimony: *US v Alexander* 526 F2d 161 at 163-4 (8th Cir 1975); *US v Smith* 776 F2d 892 at 898 (10th Cir 1985); *US v Metzger* 778 F2d 1195 at 1203 (6th Cir 1985); *US v Shorter* 809 F2d 54 at 59-60 (DC Cir); *US v Smith* 869 F2d 348 at 351 (7th Cir 1989); *Christophersen v Allied Signal Corp* 939 F2d 1106 at 1110-11 and 1115-16 (5th Cir 1991) (en banc); *Daubert v Merrell Dow Pharmaceuticals Inc* 951 F2d 1128 at 1129-30 (9th Cir 1991). However, several circuits had rejected the *Frye* standard in favour of a more generalised inquiry: *US v Baller* 519 F 2d 463 at 465-6 (4th Cir 1975); *US v Downing* 753 F2d 1224 at 1237-40 (3rd Cir 1985); *US v Piccinonna* 885 F2d 1529 at 1536-7 (11th Cir 1989); *US v Jokobetz* 955 F2d 786 at 793-7 (2nd Cir 1992).

7 G Edmond and D Mercer, "Recognising *Daubert*: What Judges Should Know About Falsificationism" (1997) 5 *Expert Evidence* 29; A Schwartz, "A 'Dogma of Empiricism' Revisited: *Daubert v Merrell Dow Pharmaceuticals Inc* and the Need to Resurrect the Philosophical Insight of *Frye v United States*" (1997) 10 *Harvard Journal of Law & Technology* 149.

- the known or potential error rate, and finally,
- whether the theory or technique has received 'general acceptance'.⁹

Following the *Daubert* decision there had been inconsistency in the federal circuits concerning the relevance of *Daubert* and the *Daubert* criteria to proffers of non-scientific evidence.¹⁰ The 'inconsistency' motivating the *Kumho* appeal could be traced back to dissenting opinion in the *Daubert* case. Perceiving difficulties with the application of the majority's framework, Chief Justice Rehnquist expressed concern that distinctions between scientific and non-scientific evidence would raise future problems:

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- 8 See S Jasanoff, *The Fifth Branch: Science Advisers as Policymakers*, Harvard University Press (1990); D Chubin and E Hackett, *Peerless Science: Peer Review and US Science Policy*, State University of New York Press (1990); G Travis and H Collins, "New Light on Old Boys: Cognitive and Institutional Particularism in the Peer Review System" (1991) 16 *Science, Technology & Human Values* 322; H Collins, "Tantalus and the Aliens: Publications, Audiences and the Search for Gravitational Waves" (1999) 29 *Social Studies of Science* 163.
- 9 Note 1 *supra* at 593-4. For a discussion of the use of these and other 'criteria' see G Edmond, "Judicial Representations of Scientific Evidence" (2000) 63 *Modern Law Review* 216. For an elaboration of the *Daubert* criteria consider K Foster and P Huber, *Judging Science: Scientific Knowledge and the Federal Courts* (1997), and a related critique G Edmond and D Mercer, "Juggling Science: From Polemic to Pastiche" (1999) 13 *Social Epistemology* 215.
- 10 Some courts applied the *Daubert* judgment to non-scientific and engineering evidence: *Rosaldo v Deters* 5 F 3d 119 at 124 (5th Cir 1993); *American & Foreign Ins Co v General Elec Co* 45 F3d 135 at 138-9 (6th Cir 1995); *Cook v America SS Co* 53 F3d 733 at 739-40 (6th Cir 1995); *Deimer v Cincinnati Zub-Zero Products Inc* 58 F3d 341 at 344-5 (7th Cir 1995); *Pestel v Vermeer Mfg Co* 64 F3d 382 at 384 (8th Cir 1995); *US v Valasquez* 64 F3d 844 at 850 (3rd Cir 1995); *Anderson v FJ Little Machine Co* 68 F3d 1113 at 117 and 119 (8th Cir 1995); *Pedraza v Jones* 71 F3d 194 at 197 (5th Cir 1995); *Holbrook v Lykes Bros SS Co Inc* 80 F3d 777 at 780 and 782 (3rd Cir 1996); *Roback v VIP Transport Inc* 90 F3d 1207 at 1215 (7th Cir 1996); *Peitzmeier v Hennessy Industries Inc* 97 F3d 293 at 297 (8th Cir 1996); *Tyus v Urban Search Management* 102 F3d 256 at 263 (7th Cir 1996); *People Who Care v Rockford Board of Education* 111 F3d 528 at 534 (7th Cir 1997); *Navarro v Fuji Heavy Industries Ltd* 117 F3d 1027 at 1031-2; *Watkins v Telsmith Inc* 121 F3d 984 at 989-93 (5th Cir 1997); *Dancy v Hyster Co* 127 F3d 649 at 651-2 (8th Cir 1997); *Michigan Millers Mut Ins Corp v Benfield* 140 F3d 915 at 920 (11th Cir 1998). Other courts did not apply the *Daubert* criteria or recognised complexities in their application: *US v Markum* F3d 891 at 896 (10th Cir 1993); *Tamarin v Adam Caterers Inc* 13 F3d 51 at 53 (2nd Cir 1993); *US v Muldrow* 19 F3d 1332 at 1338 (10th Cir 1994); *Berry v City of Detroit* 25 F3d 1342 at 1349 (6th Cir 1994); *Pries v Honda Moter Co Ltd* 31 F3d 543 at 545 (7th Cir 1994); *Jacobelli Const Inc v County of Monroe* 32 F3d 19 at 25 (2nd Cir 1994); *Thomas v Newton Intern Enterprises* 42 F3d 1266 at 1270n3 (9th Cir 1994); *Vadala v Teledyne Industries Inc* 44 F3d 36 at 39 (1st Cir 1995); *US v Dorsey* 45 F3d 809 at 814-15 (4th Cir 1995); *Sylla-Sawdon v Uniroyal Goodrich Tire Co* 47 F3d 277 at 282-3 (8th Cir 1995); *McCulloch v HB Fuller Co* 61 F3d 1038 at 1043 (2nd Cir 1995); *Boirawick v Shay* 68 F3d 597 at 610 (2nd Cir 1995); *US v Sinclair* 74 F3d 753 at 757 (7th Cir 1996); *US v Williams* 81 F3d 1434 at 1441-2 (7th Cir 1996); *US v 14.38 Acres of Land Sit In Leflore Cty MS* 80 F3d 1074 at 1078 (5th Cir 1996); *Compton v Subaru of America Inc* 82 F3d 1513 at 1518-19 (10th Cir 1996); *Lindh v Murphy* 96 F3d 856 at 884 (7th Cir 1996); *US v Cordoba* 104 F3d 225 at 230 (9th Cir 1997); *US v Jones* 107 F3d 1147 at 1157-60 (6th Cir 1997); *US v Webb* 115 F3d 711 at 716-17 (9th Cir 1997); *Diviero v Uniroyal Goodrich Tire Co* 114 F3d 851 at 853 (9th Cir 1997); *Freeman v Case Corp* 118 F3d 1011 at 1016 n6 (4th Cir 1997); *Masayeva on Behalf of Hopi Indian Tribe v Hale* 118 F3d 1371 at 1379 (9th Cir 1997); *McKendall v Crown Control Corp* 122 F3d 803 at 806 (9th Cir 1997); *US v Bighead* 128 F3d 1329 at 1330 (9th Cir 1997) (Noonan J dissenting at 1335); *Binakovsky v Ford Motor Co* 133 F3d 281 at 290 (4th Cir 1998); *Lauria v National Railroad Passenger Corp* 145 F3d 593 at 599-600 (3rd Cir 1998).

Questions arise from reading this part of the Court's opinion, and countless more questions will surely arise when hundreds of district judges try to apply its teaching to particular offers of expert testimony. Does all this dicta apply to an expert seeking to testify on the basis of 'technical or other specialized knowledge' – the other types of expert knowledge to which Rule 702 applies – or are the "general observations" limited only to 'scientific knowledge'? What is the difference between scientific knowledge and technical knowledge; does Rule 702 actually contemplate that the phrase 'scientific, technical, or other specialized knowledge' be broken down into numerous subspecies of expertise, or did its authors simply pick general descriptive language covering the sorts of expert testimony which courts have customarily received?

Some six years later, the Supreme Court aimed to resolve these issues by hearing the *Kumho* appeal. Before considering the Supreme Court's judgment, some discussion of the case in the lower courts should prove salutary.

II. THE CASE OF *KUMHO TIRE CO v CARMICHAEL*

Kumho (also *Carmichael v Samyang*) was a product liability case resulting from a tire failure that caused an automotive accident, one death and several injuries. The *victims* (plaintiffs), with the assistance of a mechanical engineer (Carlson) in possession of a masters degree from Georgia Tech and a decade of experience designing and testing truck tires for Michelin, alleged that the accident had been caused by either a manufacturing or design defect in their tire. Carlson seems to have based his conclusions about the *defective* tire on the *examination and report* of a fellow employee, his *visual inspections* of the failed tire, a process by which he *claimed* to eliminate the *most likely* alternative causes of failure, especially *abuse*, and an *experiential* technique he allegedly applied to ascertain whether there had been any *substantial* abuse. 'Abuse', a term not restricted to deliberate mistreatment, was offered as the most likely alternative cause of tire failure apart from the alleged *defect*. The italicised qualifications reflect the contested nature of these descriptions. The adequacy of these assumptions and techniques, as well as descriptions of Carlson's practices, experience and motivations were vigorously disputed by the defendants.

In particular, the defendant emphasised that Carlson had only visually inspected the tire for the first time on the morning of his deposition. He had previously, based *solely* on photographs, submitted a report attributing the tire failure to a design or manufacturing defect. The defendant also noted that Carlson's *inspection* had been undertaken in a lawyer's office rather than a laboratory. After his employment with Michelin, Carlson had worked for a number of firms consulting for litigation, appearing in court on numerous occasions. This contributed to the characterisation of Carlson as a litigation expert, a 'hired gun'. Additionally, the defendants drew attention to the condition and history of the failed tire which was balding and "past-replacement". For these reasons, they challenged the admissibility of Carlson's

11 Note 1 *supra* at 600 per Rehnquist CJ (dissenting). See also M Graham, "The *Daubert* Dilemma: at Last a Viable Solution" (1998) 2 *International Journal of Evidence and Proof* 211.

testimony – as insufficiently reliable – and asked the judge to grant summary judgment – alleging the plaintiffs did not have a viable case – in their favour.¹²

A. District Court

Butler CJ, of the District Court, excluded Carlson's testimony on the cause of tire failure.¹³ On the basis of training and experience, Butler CJ accepted that Carlson was qualified to testify, but excluded his testimony on the grounds that it was inadmissible under the reliability requirement of Rule 702.

For the purpose of this article, the crux of the matter is that Butler CJ excluded Carlson's expert testimony after applying the four factors listed in *Daubert*. Employing the 'gatekeeper' function and emphasising the importance of evidentiary reliability to protect the jury, Butler CJ determined that:

none of the criteria set forth by the Supreme Court for admissibility of scientific evidence under Rule 702 have been satisfied in this case ... The court has a responsibility to serve as a gatekeeper, ensuring that purportedly expert testimony does not reach a jury unless that testimony is reliable and reasonable.¹⁴

Subsequent attempts by the plaintiffs to characterise Carlson's engineering testimony as non-scientific, in an endeavour to circumvent the strict *Daubert* analysis, were dismissed: "plaintiffs' efforts to recast Carlson's testimony in a 'technical' light cannot succeed. The *Daubert* test clearly applies in this case, and plaintiffs' argument to the contrary is specious."¹⁵ Following this adverse judgment, the plaintiffs appealed the exclusion of Carlson's evidence to the Eleventh Circuit Court of Appeals.

B. Eleventh Circuit Court of Appeals

The Eleventh Circuit reversed the District Court judgment on appeal and remanded the case for reconsideration. Rather than a resounding endorsement of Carlson's methods and conclusions, the reversal was based on the trial court's *improper* application of the *Daubert* criteria to Carlson's *non-scientific* testimony.¹⁶

The Court of Appeals reviewed the District Court's decision to apply *Daubert* to the *Kumho* case. Citing opinions from other federal circuits the Court of Appeals explained that:

Daubert does not create a special analysis for answering questions about the admissibility of all expert testimony. Instead, it provides a method for evaluating the reliability of witnesses who claim *scientific* expertise.¹⁷

12 It is not my intention to explore the detailed factual nexus associated with *Kumho* here. For two quite polarised accounts consider the *Petitioners* and *Respondents* briefs, available on *Lexis* and *infra* notes 66-67. I have considered some of these issues in a longer paper: "Engineering Knowledge: Contested Representations of Law, Science (and Non-science) and Society" presented at Spectres of Law: Legal Theory at the *fin-de-siècle*, Birkbeck College, University of London, September 1999.

13 *Carmichael v Samyang Tire Inc* 923 FSupp 1514 (SD.Ala 1996).

14 *Ibid* at 1522.

15 *Ibid*.

16 *Carmichael v Samyang Tire Inc* 131 F3d 1433 (11th Cir 1997).

17 *Ibid* at 1435 (emphasis added).

The Court based its decision on constraints identified in the *Daubert* judgment: "the Supreme Court ... explicitly limited its holding to cover only the 'scientific context'."¹⁸ But the Eleventh Circuit judges extended the rationale by drawing upon other considerations. They stressed that *Daubert* applied to reliability assessments, but that the role of the trial judge as "gatekeeper is not intended to serve as a replacement for the adversary system", and that careful instructions and cross-examination were the appropriate means of "attacking shaky but admissible evidence".¹⁹

The Court of Appeals acknowledged that their approach raised the question: "What, then, is the difference between scientific and non-scientific testimony?" Its answer: "In short, a scientific expert is an expert who relies on the application of scientific principles, rather than on skill- or experienced based observations, for the basis of his opinion."²⁰ That led to the specific issue of "whether Carlson's testimony is based on his application of scientific principles or theories (which we should submit to a *Daubert* analysis) or his utilization of personal experience and skill with failed tires (which we would usually expect a district court to allow a jury to evaluate)".²¹

They concluded that "Carlson's testimony falls outside the scope of *Daubert* and that the district court erred as a matter of law by applying *Daubert* in this case".²² That finding was not dispositive of Carlson's entry into the case. The Court accepted that obstacles to admission remained. Improper standards had been applied, now the testimony would have to be reconsidered according to the proper standard. These considerations were left to the discretion of the District Court on remand.

In the interim, the Supreme Court granted certiorari.

C. Supreme Court

Faced with the dilemma of how to interpret and apply Rule 702 to non-scientific expert evidence, the Supreme Court emphasised the importance of relevance, reliability and gatekeeping, in a way that portrayed the *Kumho* decision as part of an organic extension or explication of the *Daubert* judgment.

At the very beginning of the *Kumho* judgment, *Daubert* was introduced as the relevant framework through which to interpret the meaning of Rule 702 and decisions about the admissibility of *all* expert evidence.

We conclude that *Daubert's* general holding – setting forth the trial judge's general "gatekeeping" obligation – applies not only to testimony based on "scientific" knowledge, but also to testimony based on "technical" and "other specialized" knowledge.²³

18 *Ibid.* Those cases included: *Iacobelli Const Inc v County of Monroe* 32 F3d 19 (2nd Cir 1994); *US v Sinclair* 74 F3d 753 (7th Cir 1996); *Compton v Subaru of America Inc* 82 F3d 1513 (10th Cir 1996); *US v Cordoba* 104 F3d 225 (9th Cir 1997).

19 *Ibid.*

20 *Ibid.*

21 *Ibid* at 1436.

22 *Ibid.*

23 Note 2 *supra* at 246.

The judge's 'gatekeeping obligation' was expanded and, as we shall see, the emphasis on reliability reiterated.

The *Kumho* judgment also responded to the following question: in the process of determining the admissibility of non-scientific evidence, may the specific factors listed in *Daubert* be considered?

We also conclude that a trial court *may* consider one or more of the more specific factors that *Daubert* mentioned when doing so will help determine that testimony's reliability. But, as the Court stated in *Daubert*, the test of reliability is 'flexible', and *Daubert's* list of specific factors neither necessarily nor exclusively applies to all experts or in every case.²⁴

With some qualification, signifying the importance placed upon flexibility in the determination of reliability, the Court explained: "Emphasizing the word 'may' in the question, we answer that question 'yes'... Our emphasis on the word 'may' thus reflects *Daubert's* description of the Rule 702 inquiry as 'a flexible one'."²⁶ This was because, according to the Court, the factors mentioned in *Daubert* "do not constitute a 'definitive checklist or test'."²⁷ The gatekeeping inquiry was to "be 'tied to the facts'."²⁸

The Supreme Court again vested residual discretion in trial judges. That authority was strategically designated by the gatekeeping metaphor, with its implication of the existence of an external 'threat'. In this capacity, *Daubert* survived as the basis for the exclusion of 'unreliable' evidence, even though the applicability of the specific *Daubert* criteria remained as indeterminate as ever. This indeterminacy could be attributed to the tremendous range of non-scientific expert testimony submitted to federal courts. The Supreme Court explained:

The conclusion, in our view, is that we can neither rule out, nor rule in, for all cases and for all time the applicability of the factors mentioned in *Daubert*, nor can we now do so for subsets of cases categorized by category of expert or by kind of evidence. Too much depends upon the particular circumstances of the particular case at issue.²⁹

The application of the relevant criteria was left to the trial judge, with little guidance as to their suitability: "[A] trial court should consider the specific factors identified in *Daubert* where they are reasonable measures of the reliability of expert testimony."³⁰ And again: "Whether *Daubert's* specific factors are, or are not, reasonable measures of reliability in a particular case is a matter that the law grants the trial judge broad latitude to determine."³¹

The reasons for the extension of *Daubert* to all proffers of 'technical and specialized knowledge' were attributed not only to the language of Rule 702 and the *Daubert* judgment, but to the practical difficulties involved in creating a (bright-line) division between scientific and non-scientific expert testimony:

24 *Ibid.*

25 *Ibid* at 251.

26 *Ibid.*

27 *Ibid* at 246.

28 *Ibid.*

29 *Ibid* at 252.

30 *Ibid* (emphasis added).

31 *Ibid* at 253 (emphasis added).

We do not believe that Rule 702 creates a schematism that segregates expertise by type while mapping certain kinds of questions to certain kinds of experts. Life and the legal cases that it generates are too complex to warrant so definitive a match.³²

Variation in the types of expert evidence and the absence of universal criteria or bright-lines between different types of expertise resulted in the court manifesting a role for 'the field'. Commitment to gatekeeping required the judge to hold the expert testifying in the courtroom to "the same level of intellectual rigour that characterizes the practice of an expert in the relevant field".³³

All of the reasoning was presented as consistent with the earlier *Daubert* decision:

Daubert itself is not to the contrary. It made clear that its list of factors was meant to be helpful, not definitive. Indeed, those factors do not all necessarily apply even in every instance in which the reliability of scientific testimony is challenged.³⁴

Despite the emphasis on flexibility and discretion, the Supreme Court held that the District Court's original decision, based on the application of *all* the *Daubert* criteria to Carlson's testimony "was within its discretion and therefore lawful".³⁵

The *Kumho* judgment stands for the importance of judicial gatekeeping to ensure evidentiary reliability. The Supreme Court explained that the *Daubert* criteria may be relevant in determining the reliability of scientific as well as non-scientific expert evidence. The practices of the field, a standard curiously similar to that adopted in *Frye*, should guide the application of the *Daubert* criteria and any other factors determined to be relevant to the assessment of reliability.

III. ANALYSIS

Before embarking upon a brief discussion of some of the potential implications of *Daubert* and *Kumho* for Australian evidence law, I have attempted to provide some analysis of these judgments in the context of their role in the United States civil justice system.

A. 'Gatekeeping', 'Reliability' and the 'Liberal Thrust'

Whilst *reliability* had been an underlying motivation associated with the use of the *Frye* test, in *Daubert* it became an explicit, if not the central, feature guiding the admission of expert opinion evidence. As previously indicated, in *Daubert*, scientific *reliability* was closely associated with four criteria. They provided some indication of the standard expected by the Supreme Court. The

32 *Ibid* at 252.

33 *Ibid*. This was the kind of standard preferred in *American Intern Adjustment Co v Galvin* 86 F3d 1455 at 1465 (7th Cir 1996).

34 *Kumho*, note 2 *supra* (emphasis added).

35 *Ibid* at 247.

emphasis on reliability was emphatically endorsed in the *Kumho* judgment.³⁶ For both scientific and non-scientific evidence the minimum standard for entry to the courtroom was that expert evidence should be *reliable*. In the actual case of *Kumho*, reliability was determined by the application of the *Daubert* criteria. The Supreme Court endorsed the findings of the District Court. Even though Carlson was a degree qualified engineer, his expert testimony was nevertheless *unreliable*.

However, the Supreme Court's emphasis on *reliability* is not without its difficulties. *Reliability* is not self-exemplifying, nor was the concept without dissension among the parties or the lower courts. *Reliability* has no immutable meaning. The *Kumho* judgment affords little insight into the Supreme Court's selection of the *Daubert* criteria as the appropriate indicia of (their preferred version of) *reliability*. Their selection and use reflected the Court's commitment to an exacting standard of reliability. Further, the eventual standard was remarkably similar to the standard proposed in a range of industry, corporate and

36 *Daubert's* emphasis on *reliability* (and relevance) was a feature of most post-*Daubert* judgments concerned with expert evidence: *Cantrell v Gaf Corp* 999 F2d 1007 at 1014 (6th Cir 1993); *Frymire-Brinati v KPMG Peat Marwick* 2 F3d 183 at 186 (7th Cir 1993); *US v Bynum* 3 F3d 769 at 773 (4th Cir 1993); *US v Martinez* 3 F3d 1191 at 1196-8 (8th Cir 1993); *US v Amador-Galvin* 9 F3d 1414 at 1418 (9th Cir 1993); *US v Evanoff* 10 F3d 559 at 561n4 (8th Cir 1993); *Fusco v General Motors Corp* 11 F3d 259 at 264 (1st Cir 1993); *Marcel v Placid Oil Co* 11 F3d 563 at 567 (5th Cir 1994); *US v Bonds* 12 F3d 540 at 555-6 (6th Cir 1993); *Robinson v Missouri Pacific R Co* 16 F3d 1083 at 1088-9 (10th Cir 1994); *US v Quinn* 18 F3d 1461 at 1465 (9th Cir 1994); *Berry v City of Detroit* 25 F3d 1342 at 1350-1 (6th Cir 1994); *US v Rincon* 28 F3d 921 at 924-6 (9th Cir 1994); *US v Jouhanson* 28 F3d 1487 at 1497 (8th Cir 1994); *US v Chischilly* 30 F3d 1144 at 1152 (9th Cir 1994); *Sorensen by and through Dunbar v Shaklee Corp* 31 F3d 638 at 650 (8th Cir 1994); *Knudsen v Secretary of Dept of Hlth & Hum Serv* 35 F3d 543 at 548 (Fed Cir 1994); *Pioneer Hi-Bred Intern v Holden Foundation Seeds* 35 F3d 1226 at 1230 (8th Cir 1994); *Habecker v Clark Equipment Co* 36 F3d 278 at 290 (3rd Cir 1994); *McKnight v Johnson Controls Inc* 36 F3d 1396 at 1406 (8th Cir 1994); *Bradley v Brown* 42 F3d 434 at 437-8 (7th Cir 1994); *US v Dorsey* 45 F3d 809 at 813 (4th Cir 1995); *US v Pierre* 47 F3d 241 at 243 (7th Cir 1995); *Watkins v Schriver* 52 F3d 769 at 771 (8th Cir 1995); *Christopher v Cutter Laboratories* 53 F3d 1184 at 1191 (11th Cir 1995); *US v Johnson* 56 F3d 947 at 952 (8th Cir 1995); *Hoult v Hoult* 57 F3d 1 at 4-5 (1st Cir 1995); *Asplunh Mfg Div v Benton Harbour Engineering* 57 F3d 1190 at 1202 (3rd Cir 1995); *US v Brien* 59 F3d 274 at 275 (1st Cir 1995); *US v Powers* 59 F3d 1460 at 1470-1 (4th Cir 1995); *US v Valasquez* 64 F3d 844 at 849 (3rd Cir 1995); *Ventura v Titan Sports Inc* 65 F3d 725 at 733 (8th Cir 1995); *Benedi v McNeil-PPC Inc* 66 F3d 1378 at 1383-5 (4th Cir 1995); *US v Thomas* 74 F3d 676 at 681 (6th Cir 1996); *US v Reynolds* 77 F3d 253 at 255 (8th Cir 1996); *Holbrook v Lykes Bros SS Co Inc* 80 F3d 777 at 781 and 784 (3rd Cir 1996); *Marbled Murrelet v Babbitt* 83 F3d 1060 at 1067 (9th Cir 1996); *US v Black Cloud* 101 F3d 1258 at 1261 (8th Cir 1996); *Allen v Pennsylvania Engineering Corp* 102 F3d 194 at 196 (5th Cir 1996); *US v Beasley* 102 F3d 1440 at 1446 (8th Cir 1996); *US v Davis* 103 F3d 660 at 673 (8th Cir 1996); *Wintz by and through Wintz v Northrop Corp* 110 F3d 508 at 512 (7th Cir 1997); *Cortez-Irizarry v Corporación Insular* 111 F3d 184 at 188-9 (1st Cir 1997); *US v Schneider* 111 F3d 197 (1st Cir 1997); *Penney v Praxair Inc* 116 F3d 330 at 333 (8th Cir 1997); *Schudel v General Elec Co* 120 F3d 991 at 996 (9th Cir 1997); *Kannankeril v Termitix Intern, Inc* 128 F3d 802 at 806 (3rd Cir 1997); *US v Call* 129 F3d 1402 at 1404-7 (10th Cir 1997); *Jenson v Eleventh Taconite Co* 130 F3d 1287 at 1298 (8th Cir 1997); *CB Fleet v Smithkline Beecham Consumer Healthcare* 131 F3d 430 at 437 (4th Cir 1997); *Summers v Missouri Pacific RR System* 132 F3d 599 at 603 (10th Cir 1997); *Maryland Cas Co v Therm-O-Disc Inc* 137 F3d 780 at 783 and 785 (4th Cir 1998); *Cybor Corp v FAS Technologies Inc* 138 F3d 1448 at 1481 (Fed. Cir 1998). Another example of the non-reflexive use of 'reliability', on this occasion designed to promote a liberalisation of English evidence law and extend the use of the behavioural sciences, is offered by F Raitt, "A New Criterion for the Admissibility of Scientific Evidence?" in H Reece (ed), *Law and Science* (1998) 153.

peak engineering *amicus curiae* briefs submitted to the Court in response to the *Kumho* appeal.³⁷ It was also held to be substantially different from the standard recommended by a range of trial lawyers, plaintiff organisations and legal academics. Admissibility standards, even those described in terms of *reliability*, have an associated politics.³⁸

Whilst the Supreme Court reiterated the need for flexibility developed in *Daubert*, and left the standard of reliability relatively 'empty', the *Kumho* judgment represents a victory for defendants and the reinforcement of an exclusionary approach to the admission of expert evidence. This orientation can be detected in the triumph of 'gatekeeping', the demise of the civil jury, a belief in the prevalence of 'junk' (non-)science and an overall ethos aimed at raising the admissibility threshold.

Along with the emphasis on gatekeeping, the *Kumho* judgment omitted any reference to the liberalisation motivating the enactment of the FRE. In *Daubert*, the Supreme Court had referred to the 'liberal' or inclusive thrust motivating the enactment of the FRE. *Kumho* makes no such pretence.³⁹ In *Kumho*, a somewhat different image of the FRE is presented. There, among the few substantive references to the FRE, an exclusionary emphasis is propagated. First, Breyer J cited an extract from the *Joiner* decision expressing grounds for the exclusion of evidence: "Nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert."⁴⁰ Subsequently, when discussing the discretions available to judges, Scalia, O'Connor and Thomas JJ explained that judges were

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- 37 Supreme Court Rule 37 allows a non-party to file a brief in a case, with either the consent of both parties or leave of the Court, "that brings to the attention of the Court relevant matters not already brought to its attention by the parties". See also Rule 29 Federal Rules of Appellate Procedure, 28 USCA. For a discussion see: A Wohl, "Friends with Agendas" (November 1996) *ABA Journal* 46.
- 38 For an example of a disagreement over 'reliability' consider the division among the judges in the appeal: *US v Brannon* 146 F3d 1194 (9th Cir 1998). On related issues see: *US v DeWaier* 846 F2d 528 (9th Cir 1988); *State v Kennedy* 657 A2d 773 (Me 1995); *People v DeMarasse* 623 NYS2d 845 (Ct App 1995); *Temple v State* 679 So2d 611 (Miss 1996).
- 39 *Daubert's* reference to the 'liberal thrust', and an expression of confidence in the jury, produced inconsistency among the lower courts when combined with the simultaneous commitment to gatekeeping, reliability and use of the specified criteria. Numerous cases referred to *Daubert* in support of the liberalisation behind the enactment of the FRE: *US v Ridlehuber* 11 F3d 516 (5th Cir 1993); *US v Bonds* 12 F3d 540 at 568 (6th Cir 1993); *Hopkins v Dow Corning Corp* 33 F3d 1116 at 1124 (9th Cir 1994); *In re Paoli RR Yard PCB Litigation* 35 F3d 717 at 741 (3rd Cir 1994); *Pioneer Hi-Bred Intern v Holden Foundation Seeds* 35 F3d 1226 at 1230 (8th Cir 1994); *US v Davis* 40 F3d 1069 at 1074 (10th Cir 1994); *Gomez v Martin Marietta Corp* 50 F3d 1511 at 1518 (10th Cir 1995); *US v Posado* 57 F3d 428 at 432 (5th Cir 1995); *US v Gomez* 67 F3d 1515 at 1526 (10th Cir 1995); *US v Kwong* 69 F3d 663 at 668 (2nd Cir 1995); *US v DiMarzo* 80 F3d 656 at 659 (1st Cir 1996); *Cavallo v Star Enterprise* 100 F3d 1150 at 1158-9 (4th Cir 1996); *Richmond v Embry* 122 F3d 866 at 878 (10th Cir 1997); *Jenson v Eleventh Taconite Co* 130 F3d 1287 at 1297 (8th Cir 1997); *Fromson v Anitec Printing Plates Inc* 132 F3d 1437 at 1447-8 (Fed Cir 1997); *Mitchell v US* 141 F3d 8 at 14 (1st Cir 1998). This did not prevent some judges describing *Daubert* as a more rigorous standard than its predecessors: *Allen v Pennsylvania Engineering Corp* 102 F3d 194 at 198 (5th Cir 1996); *Rizzo v Corning Inc* 105 F3d 338 at 340 (7th Cir 1997).
- 40 *Kumho*, note 2 *supra* at 256. See also *US v Rice* 52 F.3d 843 at 847 (10th Cir 1995); *First United Financial Corp v USF & G Co* 96 F.3d 135 at 139 n6 (5th Cir 1996); *US v Artero* 121 F.3d 1256 at 1262 (9th Cir 1997); *Target Market Pub Inc v ADVO Inc* 136 F.3d 1139 at 1143 (7th Cir 1998).

“to choose among *reasonable* means of excluding” unreliable expertise.⁴¹ The only reference to expert ‘latitude’ is linked to the need for gatekeeping. Further, in *Kumho*, references to the FRE are indexed not just to ascertaining a specific level of reliability, but with the far more onerous “search for truth”.⁴² Between *Daubert* and *Kumho* there appears to be a subtle shift from a rhetoric of inclusion to one of implicit exclusion.

Kumho represents a dramatic escalation in the use of the ‘gatekeeping’ metaphor.⁴³ Concern about the civil justice system and the strategic use of the metaphor will be developed below. The *Daubert* judgment referred to gatekeeping only twice. In concluding the majority judgment, Blackmun J had alluded to the trial judge’s gatekeeping ‘responsibility’ and in dissent Rehnquist CJ conceded a gatekeeping ‘role’. In *Kumho* (and *Joiner* before it), gatekeeping had become not only ubiquitous in discussions of expert evidence but a judicial ‘obligation’.⁴⁴ This emphasis reflects a tightening of admissibility standards and

41 *Kumho*, note 2 *supra* at 256.

42 *Ibid* at 252.

43 An escalation represented in numerous federal court appeals: *In re Joint E and S Dists Asbestos Lit* 151 FRD 540 at 545-6 (SDNY 1993); *US v Martinez* 3 F3d 1191 at 1196 (8th Cir 1993); *Robinson v Missouri Pacific R Co* 16 F3d 1083 at 1088 (10th Cir 1994); *Sorensen by and through Dunbar v Shaklee Corp* 31 F3d 638 at 651 (8th Cir 1994); *US v Daccarett* 6 F3d 37 at 58 (2nd Cir 1993); *US v Sepulveda* 15 F3d 1161 at 1183 (1st Cir 1993); *Berry v City of Detroit* 25 F3d 1342 at 1350 (6th Cir 1994); *McKnight v Johnson Controls Inc* 36 F3d 1396 at 1406-7 (8th Cir 1994); *Bradley v Brown* 42 F3d 434 at 437 (7th Cir 1994); *Gruca v Alpha Therapeutic Corp* 51 F3d 638 at 643 (7th Cir 1995); *Cook v America SS Co* 53 F3d 733 at 739-40 (6th Cir 1995); *Asplunh Mfg Div v Benton Harbour Engineering* 57 F3d 1190 at 1202 (3rd Cir 1995); *Hose v Chicago Northwestern Transp Co* 70 F3d 968 at 972 (8th Cir 1995); *US v Thomas* 74 F3d 676 at 681 (6th Cir 1996); *Den Norske Bank AS v First Nat Bank of Boston* 75 F3d 49 at 57 (1st Cir 1996); *Lust v Merrell Dow Pharmaceuticals Inc* 89 F3d 594 at 597 (9th Cir 1996); *Cummins v Lyle Industries* 93 F3d 362 at 370 (7th Cir 1996); *Guillory v Domtar Industries Inc* 95 F3d 1320 at 1331 (5th Cir 1996); *Hebert v Lisle Corp* 99 F3d 1109 at 1117 (Fed Cir 1996); *Gonzalez v Trinity Marine Group Inc* 117 F3d 894 at 898-9 (5th Cir 1997); *Raskin v Wyatt Co* 125 F3d 55 at 66 (2nd Cir 1997); *Smelser v Norfolk Southern Ry Co* 105 F3d 299 at 303 (6th Cir 1997); *Ed Peters Jewelry Co v C & J Jewelry Co* 124 F3d 252 at 259 (1st Cir 1997); *Tenbrage v Ames Taping Tool Systems Inc* 128 F3d 656 at 659 (8th Cir 1997); *CB Fleet v Smithkline Beecham Consumer Healthcare* 131 F3d 430 at 437 (4th Cir 1997); *Zuchowicz v US* 140 F3d 381 at 386 (2nd Cir 1998); *Michigan Millers Mut Ins Corp v Benfield* 140 F3d 915 at 921 (11th Cir 1998).

44 *Kumho*, note 2 *supra*; *General Electric Company v Joiner* 522 US 136 at 139; L Ed 2d 508 at 516 and 519-20; 118 S Ct 512 (1997).

a corresponding, though unexplained, concern about the prevalence of questionable expertise or 'junk science'.⁴⁵

The *Kumho* Court ruled that the 'gatekeeping obligation' applies "not only to testimony based on 'scientific' knowledge, but also to testimony based on 'technical' and 'other specialized knowledge'".⁴⁶ Ironically, given *Daubert's* reference to the 'liberal thrust' behind the FRE, one of the factors motivating gatekeeping was the 'testimonial latitude' available to expert witnesses. Gatekeeping had, by the occasion of the *Kumho* judgment, become such an important component in the assessment of expert evidence that it even informed the Court's commitment to flexibility. The *Kumho* Court explained that flexibility in applying *Daubert* does not provide the trial judge with "discretion to abandon the gatekeeping function".⁴⁷

The exclusionist orientation, delineated in *Kumho*, is read back into previous decisions. The reference in *Daubert* to cross examination as a means of attacking admissible 'shaky' evidence, is now seriously qualified.⁴⁸ By excluding the evidence of the professional engineer, Carlson, as insufficient to constitute even 'shaky' evidence, that phrase is (re)presented to stand for a far more exclusionist guise than apparently expressed in the earlier *Daubert* decision. Another example of this trend can be drawn from the Court's qualifications to the general acceptance test. The plaintiffs and their amici had sought some kind of liberalised form of general acceptance in their various submissions. For the Court, general acceptance was of limited value because, by itself, it could not guarantee that the knowledge claims, or even the fields, were sufficiently reliable to warrant admission. General acceptance was best qualified by the use of other (*Daubert*) criteria: "Nor... does the presence of *Daubert's* general acceptance

45 These concerns are represented in numerous judgments: *Joiner*, note 5 *supra* at 523 n6 (1997); *Wilson v City of Chicago* 6 F3d 1233 at 1238 (7th Cir 1993); *Hodges v Secretary of DHHS* 9 F3d 958 at 962 n5 (Fed. Cir 1993); *Buckley v Fitzsimmons* 20 F3d 789 at 796 (7th Cir 1994); *Underwager v Salter* 22 F3d 730 at 735-6 (7th Cir 1994); *EEOC v O & G Spring and Wire Forms Specialty* 38 F3d 872 at 891 (7th Cir 1994); *Berry v City of Detroit* 25 F3d 1342 at 1349 (6th Cir 1994); *Iacobelli Const Inc v County of Monroe* 32 F3d 19 at 25 (2nd Cir 1994); *Sierra Club v Marita* 46 F3d 606 at 621-2 (7th Cir 1995); *Rosen v Ciba-Geigy Corp* 78 F3d 316 at 318-319 (7th Cir 1996); *US v Williams* 81 F3d 1434 at 1441-2 (7th Cir 1996); *US v Thomas* 74 F3d 676 at 681 (6th Cir 1996); *Braun v Lorillard Inc* 84 F3d 230 at 233 (7th Cir 1996); *Lust v Merrell Dow Pharmaceuticals Inc* 89 F3d 594 at 597 (9th Cir 1996); *Wright v Willamette Industries Inc* 91 F3d 1105 at 1107-8 (8th Cir 1996) (Majority); *Edgar v KL* 93 F3d 256 at 260 (7th Cir 1996); *Barrett v Atlantic Richfield Co* 95 F3d 375 at 382-3 (5th Cir 1996); *BF Goodrich v Betkoski* 99 F3d 505 at 525 (2nd Cir 1996); *Tyus v Urban Search Management* 102 F3d 256 at 263 (7th Cir 1996); *Stagl v Delta Air Lines Inc* 117 F3d 76 at 81 (2nd Cir 1997); *Summers v Missouri Pacific RR System* 132 F3d 599 at 603-4 (10th Cir 1997); *Cabrera v Cordis Corp* 134 F3d 1418 at 1420-1 (9th Cir 1998); *Burns Philp Food v Cavalea Continental Freight* 135 F3d 526 at 530-1 (7th Cir. 1998); *DePaepe v General Motors Corp* 141 F3d 715 at 719 (7th Cir 1998).

46 Note 2 *supra* at 246 and 249-50.

47 *Ibid* at 256.

48 A similar position was articulated in *Guillory v Domtar Industries Inc* 95 F3d 1320 at 1331 (5th Cir 1996). Compare: *Spain v Gallegos* 26 F3d 439 at 453 (3rd Cir 1994); *Markman v Westview Instruments Inc* 52 F3d 967 at 1006 (Fed Cir 1995), per Newman J (dissenting); *US v Johnson* 56 F3d 947 at 953 (8th Cir 1995); *US v Kayne* 90 F3d 7 at 11-12 (1st Cir 1996); *Doe v Claiborne County Tenn* 103 F3d 495 at 515 (6th Cir 1996). Consider also the earlier case of *Trower v Jones* 520 NE2d 297 at 299-301 (Ill 1988) discussing cross examination in relation to expert evidence.

factor help show that an expert's testimony is reliable where the discipline itself lacks reliability."⁴⁹

Judicial anxiety was not restricted to particular experts, but extended to whole fields. However, as we shall see, the reliance on some degree of 'acceptance' is ultimately inescapable.

B. The (American) Jury and the Dangers of 'Junk Science'

Why was vigilant gatekeeping, ensuring the 'high' standard of reliability, required? Among the most convincing explanations seems to be an anxiety among the Supreme Court judges that the United States civil justice system was inhabited by charlatan experts promulgating their litigation-based theories and an attendant distrust of lay juries. The enhanced prominence placed upon the 'gatekeeping obligation' – itself suggesting the reality of 'dangerous' expertise – was mentioned among the *Kumho* judgments. Scalia, O'Connor and Thomas JJ indicated that judicial discretions were designed to enable the exclusion of "expertise that is *fausse* and science that is junky".⁵⁰ For the judges, the existence of *dangerous* (described as 'unreliable') expertise seemed to challenge the proper workings of the civil justice system.

The existence of 'unreliable' or 'junk' expertise threatened the civil justice system because of the central role afforded to the jury. The *Kumho* judgment omitted not only *Daubert's* 'liberal' interpretation of the FRE but also its alleged commitment to the Seventh Amendment right to trial by jury. The *Daubert* majority had expressed confidence in not only the jury, but the adversary system more generally:

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 [Merrell Dow] seems to us to be overly pessimistic about the capabilities of the jury and of the adversary system generally. Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking *shaky* but admissible evidence.⁵¹

In contrast, the *Kumho* judgment makes almost no reference to the jury in extending and explicating the *Daubert* regime. The confidence mouthed in *Daubert* is absent. Instead, the jury is mentioned in relation to the importance of evidentiary reliability: "The trial judge's effort to assure that the specialized testimony is *reliable* and relevant can help the jury evaluate that foreign

49 Note 2 *supra* at 252

50 *Ibid* at 256. P Huber, *Galileo's Revenge: Junk Science in the Courtroom*, Basic Books (1991) seems to be the primary source of the concept. Subsequently its use has escalated, especially in the United States. Consider D Bernstein, "Junk Science in the United States and the Commonwealth" (1996) 21 *Yale Journal of International Law* 123 and M Angell, *Science on Trial: The Clash of Medical Evidence and the Law in the Breast Implant Case*, Norton (1996). For a response to Huber, see K Chesebro, "Galileo's Retort: Peter Huber's Junk Scholarship" (1993) 42 *American University Law Review* 1637. For a discussion of the concept of 'junk science' consider G Edmond and D Mercer, "Trashing 'Junk' Science" (1998) *Stanford Technology Law Review*, available at <<http://stanford.edu/STLR/Articles/Index.htm>>.

51 Note 1 *supra* at 595-6 (emphasis added).

experience, whether the testimony reflects scientific, technical, or other specialized knowledge."⁵² Implicitly, the jury requires the assistance of judges to manage their access and assessment of foreign testimony. In pursuing this line of argument, the Court cited an article written a century ago by Learned Hand which, among other things, was highly critical of the evaluation of expert testimony by lay juries.⁵³

C. Amicus Curiae Briefs and the *Daubert-Kumho* Ethos

One way to gauge some of the interests and policy dimensions motivating the *Kumho* judgment is to explore the various *amicus curiae* briefs submitted to the Supreme Court in relation to the appeal.⁵⁴ Whilst it is not my intention to link these directly to the concerns and decisions of judges, there are conspicuous similarities in the preferred outcomes and even rationales between the Supreme Court judgments and the briefs submitted in support of the defendants. Notably, the majority of those briefs were written on behalf of manufacturing, industrial, insurance and tort reform organisations.

With some simplification, the briefs submitted to the Supreme Court can be divided into two basic sets, supporting either the plaintiffs or respondents. Those in support of the defendants (petitioners) encouraged the Court to extend the *Daubert* framework to proffers of non-scientific testimony. They emphasised the importance of evidentiary reliability – again, as if it were immutable – whilst supporting a rigorous regime of gatekeeping and, where possible, the strict

52 Note 2 *supra* at 251 (emphasis added).

53 The same authoritative article was cited in five of the briefs. *National Academy of Engineering* cited the article to make a similar point to the Court (p 4). *Tort Reform* (pp 10-11), *Petitioners* (p 23) and the *Washington Legal Foundation* (p 9) all referred to the article in support of their criticisms of jury competence. *Professors of Evidence Law* cited the article to support the proposition that the law needs to make use of experts (p 14). Learned Hand's article, "Historical and Practical Considerations Regarding Expert Testimony" (1901) 15 *Harvard Law Review* 40, and others, like L Friedman, "Expert Testimony, its Abuse and Reformation" (1910) 19 *Yale Law Journal* 247, provide some indication of the long history of expert and jury scepticism, which predates them both by centuries.

54 The groups in support of the Petitioners (*Kumho*) included: The American Automobile Manufacturers Association, The Association of International Automobile Manufacturers Inc and Society of Automotive Engineers Inc; The Defense Research Institute; Stephen N Bobo, Donald G Carter, William J Coad, Ernest L Daman, John D Graham, Nathan H Hurt, A Alan Moghissi, Francesco Pompei, James R Wallace and Richard Wilson (engineers); John Allen, Gregory Baecher, Edward Bouwer, Everett Carter, Stephen Director, Richard Meehan, Gene Parkin, Bruce Rittman, Yaron Sternberg, Donald Vannoy, David Waggoner, Christopher Wilt, and Gordon Wolman (engineers); American Insurance Association and National Association of Independent Insurers; The National Academy of Engineering; Rubber Manufacturers Association; American Tort Reform Association, American Consulting Engineers Council, and National Association of Manufacturers; United States; The Washington Legal Foundation and The Manufacturers Alliance. The groups in support of the Respondents (plaintiffs) included: The National Academy of Forensic Engineers; Attorneys Information Exchange Group Inc; Neil Vidmar, Richard O Lempert, Shari Seidman Diamond, Valerie P Hans, Stephan Landsman, Robert Maccoun, Joseph Sanders, Harmon M Hosch, Saul Kassir, Marc Galanter, Theodore Eisenberg, Stephen Daniels, Edith Greene, Joanne Martin, Steven Penrod, James Richardson, Larry Heuer and Irwin Horowitz (jury researchers); Margaret A Berger, Edward J Imwinkelried, and Stephen A Saltzburg (professors of evidence law); Trial Lawyers For Public Justice PC, Public Citizen Inc, and The Center for Auto Safety; Bona Shipping (US) Inc, Liberty Maritime Corporation, Marine Transport Lines Inc, Maritime Overseas Corporation, and The Offshore Marine Service Association; The Association of Trial Lawyers of America.

application of the *Daubert* criteria. These precautions were necessitated by the prevalence of charlatan experts willing to testify to any proposition and the continued influence of incompetent lay juries, confused and deferential to infallible experts. Any reluctance to curtail the admission of 'unreliable' testimony and actively manage jury decision-making would produce deleterious effects on business and, by extension, all of society.

In contrast, the submissions in support of the plaintiffs (respondents) offered a very different representation of, not just the meaning of Rule 702, but the entire litigation landscape. It would seem that the meanings of Rule 702 are inextricably linked to particular social visions. For the plaintiffs and their amici, *Daubert* had inaugurated a tightening of the admissibility standards surrounding expert opinion evidence. This restriction flew in the face of *Daubert's* 'recognition' of the liberal thrust behind the FRE and confidence in the jury and adversarial system. Amici recognised the need for reliability and gatekeeping, but placed the standards somewhat lower than the defendants. The respondents did not believe *Daubert* should be extended to non-scientific evidence because there was no universal criteria which could be meaningfully applied. Instead of the rigid application of the *Daubert* criteria, a position they associated with the defendants (and the exclusion of evidence), most preferred a weak version of the 'general acceptance' test. For plaintiffs, the application of the *Daubert* criteria was described as not only arbitrary, but oppressive. Further, the respondents challenged the empirical basis of the petitioners' claims about the prevalence of charlatan experts, and in considerable detail, including authority drawn from *Daubert* (cited above), the incompetence of the civil jury. In particular, they stressed the rights entrenched in the Seventh Amendment and the dangers involved in replacing the jury with restrictive judicial admissibility determinations. The submissions included a brief on behalf of eighteen of the leading jury researchers from universities and institutes across the United States which responded directly to the 'unfounded' claims it identified among the petitioners' briefs. Altogether, the (allegedly) pernicious effects of these changes in evidence admission standards were not conceived in relation to their effects on business, but rather to plaintiff access to the court and the spill-on effects which might exclude forensic scientific techniques from criminal prosecutions.⁵⁵ There is almost no indication of these concerns among the *Kumho* judgments.

Given these two polarised approaches to the issues raised in the *Kumho* appeal, the Supreme Court judgment should be understood as a comprehensive victory for the defendants (petitioners). However, the similarities do not stop

55 *Daubert v Merrell Dow Pharmaceuticals Inc* 43 F3d 1311 at 1317 (9th Cir 1995). Examples of the use of general acceptance in relation to forensic evidence after *Daubert* include: *US v McCaskey* 9 F3d 368 at 380 (5th Cir 1993); *US v Yoon* 128 F3d 515 at 527 (5th Cir 1997); *US v Griffiths* F3d 318 at 323 (5th Cir 1997); *US v Vitek Supply Corp* 144 F3d 476 at 485 (7th Cir 1998); *US v Klimusacius-Viloria* 144 F3d 1249 at 1259-60 (9th Cir 1998). Some contend that *Daubert* will improve the standard of forensic evidence. See, for example, E Beecher-Monas, "Blinded by Science: How Judges Avoid the Science in Scientific Evidence" (1998) 71 *Temple Law Review* 55. Dissatisfaction with *Frye* may have also been a result of attempts to secure the place of new forensic techniques like DNA typing. As in Australia, a number of United States criminal appeals in the late 1980s and early 1990s addressed the reliability of DNA typing and the validity of statistical extrapolations.

there. Not only are the actual outcomes – the extension of the *Daubert* regime or ethos – similar, but from the foregoing discussion, the reasoning behind the *Kumho* decision seems to have correspondences with that presented by the petitioners.

This is not to suggest that the *Kumho* judgment simply reflects the *petitioners'* interests. After all, *Kumho* is a judgment and not an *amicus curiae* brief. The *Kumho* judgment makes no direct reference to the cost to industry of inconsistent decisions or unfounded verdicts. But the judgment does indicate that it is a response to inconsistency in the lower courts. Consistency can be a legal as well as an economic virtue. Apart from such implicit relations, there are a range of more explicit connections. The *Kumho* judgment refers to the existence and dangers of 'fausse' experts and 'junky' science. That orientation is reinforced in the amplification of the gatekeeping metaphor. The liberal thrust, the jury, and faith in the adversarial system are nowhere to be seen. Instead, *Daubert* is extended, but only those aspects which seem to correspond with the aspirations of the petitioners.

Read this way, *Kumho* is a continuation – even though it gives substance to – the *Daubert* revolution (inflating *Daubert*). The components of the *Daubert* judgment which gave hope to plaintiffs have been omitted and replaced with an explicit commitment to a more exclusionary regime. *Kumho* has replaced the emphasis on *Daubert's* specific criteria, which remain as a judicial resource to exclude (and occasionally include) evidence, with an exclusionary ethos.

D. The Inevitability of 'General Acceptance' (*Frye*)

One of the problems associated with the *Daubert* judgment, made more conspicuous in *Kumho*, is the need for judges to locate the appropriate standards, by which to assess proffers of expertise in particular fields. In providing a (near) universal set of criteria associated with 'good science' in *Daubert*, the Supreme Court seemed to indicate that it had largely avoided this problem. Community acceptance could be diminished because the *Daubert* criteria were conceived as generally applicable to all scientific evidence. But the issue of flexibility and the existence of exceptions produced difficulties. The *Daubert* criteria do not apply to all scientific, let alone non-scientific evidence. Never having been adequately resolved, the issue of which are the appropriate criteria to apply returned to plague the Court in *Kumho*.

Given the absence of universal features underlying the production of all forms of expertise, individual proffers have to be assessed against some meaningful standard. Presumably, for most proffers of evidence, maybe with the exception of phrenology, necromancy, astrology and, as we shall see, creationism,⁵⁶ the field or discipline from which the expert originates will usually provide the appropriate indicators.⁵⁷ This means that if the *Daubert* criteria are not universal,

56 Curiously, judges and commentators often use these relatively non-controversial examples rather than more complex, relevant and instructive ones: *Kumho*, note 2 *supra* at 252; *Frye*, note 4 *supra*; *Rupe v Wood* 93 F3d 1434 at 1440 (9th Cir 1996); note 1 *supra* at 592.

57 But some courts have indicated a reluctance to be bound by experts in the field. See, for example, *US v Locascio* 6 F3d 924 (2nd Cir 1993).

then they must always be applied via some version of the (general) 'acceptance' test. Not only that, but the degree to which a technique or method is accepted in a field and its relation to an admissibility standard will be guided by the particular level of *reliability* required. Once again, *reliability* is not presupposed. Its particular manifestation will depend upon whether the jurisdiction requires near universal acceptance, general acceptance or the acceptance of a distinguished or substantial minority in a field.⁵⁸ All proffers of expertise, then, inescapably require some image of the field and some sense of the degree of acceptance, invariably linked to the requisite level of *reliability*.⁵⁹

Fundamentally, both *Daubert* and *Kumho* require the application of some type of *acceptance* test to ascertain whether judges are applying the *appropriate* criteria to determine the *reliability* of evidence. Reliability is indexed to the specific standard of acceptance required. *Acceptance* is the framework that gives meaning to the *Daubert* criteria. This means that for all the distance travelled on the *Daubert* revolution, what has been accomplished is a more demanding admissibility standard, predicated upon a questionable vision of the US legal landscape.⁶⁰

58 Discussing minority acceptance: *Daubert v Merrell Dow Pharmaceuticals Inc* 43 F3d 1311 at 1317-19 (9th Cir 1995); *Southland Sod Farms v Stover Seed Co* 108 F3d 1134 (9th Cir 1997).

59 This introduces a circularity into many, perhaps most, judgments: *US v Markum* F3d 891 at 896 (10th Cir 1993); *Porter v Whitehall Laboratories Inc* 9 F3d 607 at 613 (7th Cir 1993); *US v Bonds* 12 F3d 540 at 561-3 (6th Cir 1993); *Carroll v Morgan* 17 F3d 787 at 790 (5th Cir 1994); *US v Marsh* 26 F3d 1496 at 1508 (9th Cir 1994); *Claar v Burlington Northern R Co* 29 F3d 499 at 502 (9th Cir 1994); *US v Van Damme* 48 F3d 461 at 463 (9th Cir 1995); *US v Booker* 70 F3d 488 at 490 n5 (7th Cir 1995); *FDIC v Suna Associates Inc* 80 F3d 681 at 687 (2nd Cir 1996); *Braun v Lorillard Inc* 84 F3d 230 at 234-5 (7th Cir 1996); *US v Sherwood* 98 F3d 402 at 408 (9th Cir 1996); *BF Goodrich v Betkoski* 99 F3d 505 at 525 (2nd Cir 1996); *Sheehan v Daily Racing Form Inc* 104 F3d 940 at 942 (7th Cir 1997); *Kokoraleis v Gilmore* 131 F3d 692 at 696 (7th Cir 1997); *US v Gilliard* 133 F3d 809 at 813 (11th Cir 1998); *DePaepe v General Motors Corp* 141 F3d 715 at 719-20 (7th Cir 1998).

60 Given its significance in the United States, two recent volumes exploring the Bendectin litigation provide some insight into the types of concerns which seem to drive this perspective. The works are M Green, *Bendectin and Birth Defects: The Challenges of Mass Toxic Substances Litigation*, University of Pennsylvania Press (1996) and J Sanders, *Bendectin on Trial: A Study of Mass Tort Litigation*, University of Michigan Press (1998). Apart from providing some valuable detail, these works are conspicuous by their inability to provide a date, without retrospectively inscribing a rather vague and contestable one, between when the Bendectin litigation was legitimate and when it was illegitimate and should have been judicially terminated. Both authors are critical of juries, without adequately accounting for the numerous alternative explanations available to explain jury performance. They also assume – *a priori* – epidemiology was the most powerful type of evidence. That assumption subsequently guides their retrospective accounts and they never address the fundamental (and dispositive) concern of how and why epidemiology came to predominate. Both accounts portray the Bendectin litigation as the 'Taj Mahal' of pathological litigation and recommend the replacement of the civil jury with a variety of more technocratic fact-finders. Compare: G Edmond and D Mercer, "The Secret Life of (Mass) Torts: The Social Construction of Law-Science Knowledges in the Bendectin Litigation" (1997) 20 *UNSWLJ* 666; G Edmond and D Mercer, "Litigation Life" (2000) 30 *Social Studies of Science* (forthcoming).

IV. CONCLUSION: *FRYE*, *DAUBERT* AND *KUMHO* IN AUSTRALIA

The prevailing Australian approach to the admissibility of expert opinion evidence, with its emphasis on qualifications and/or experience and the existence of a field, shares some obvious similarities with general acceptance.⁶¹ Neither standard requires judges to become, as Rehnquist CJ facetiously described it in his *Daubert* dissent, 'amateur scientists'. Rather, the standards involve 'external' assessments of expert evidence based on formal qualifications, experience and the existence or recognition of established fields. External standards have the advantage that they can be universal, able to be adapted to all fields and practices, and do not require transforming evidence standards (like the *Daubert* criteria) into a Procrustean bed.

Conceptually, it would be only a modest step to include an inquiry into the degree of acceptance of theories, techniques and possibly even conclusions among the members of particular fields in any admissibility determination. Perhaps that line has already been crossed. As indicated, all reliability assessments require some vision of the *field* and some impression of *acceptance*. It is a more radical step (both procedurally and sociologically/philosophically) to expect judges to assess individual proffers of expert evidence based on their apparent consistency with generally accepted techniques and approaches. This process is made even more complex with the application of the abstract and tendentious *Daubert* criteria. Despite the considerable fanfare attributed to *Daubert*, because of the emphasis on 'flexibility' assessing the actual performance of accepted techniques rather than whether they are accepted seems to be the major difference between the operation of *Daubert* and *Frye*.⁶² Admittedly, *Daubert* and more recently *Kumho*, have provided judges with more

61 The following are regularly cited as leading Australian cases in respect to expert opinion evidence: *Clark v Ryan* (1960) 103 CLR 486 at 491, per Dixon CJ; *Ramsay v Watson* (1961) 108 CLR 642; *Casley-Smith v Evans & Sons Pty Ltd [No 1]* (1988) 49 SASR 314; *Bonython v R* (1984) 15 A Crim R 364 at 366; *Murphy v R* (1989) 167 CLR 94. There has been limited discussion on the relationship between the Australian standard and 'general acceptance' but some Australian cases appear, in practice, to have come close. For example: *R v Gilmore* [1977] 2 NSWLR 935 at 939-41; *Carroll* (1985) 19 A Crim R 410; *R v Lewis* (1987) 29 A Crim R 267; *Runjanjic and Kontinen v The Queen* (1991) 56 SASR 114 at 119; *R v Rose* (1993) 69 A Crim R 1 at 9; *R v J* (1994) 75 A Crim R 522 at 535-6; *R v Jarrett* (1994) 62 SASR 443; *Reg v Milat No 70114* (1994); *R v Pantoja* (1996) 88 A Crim R 554; *Lipovac v Hamilton Holdings Pty Ltd* [1996] ACTSC 98; *Deledio v Repatriation Commission* [1997] 1047 FCA; *R v Humphrey* [1999] SASC 67. Aronson and Hunter describe some of these decisions as Australian analogues to *Frye*: M Aronson and J Hunter, *Litigation: Evidence and Procedure*, Butterworths, (6th ed, 1998) pp 1119-20; A Ligertwood, *Australian Evidence*, Butterworths (3rd ed, 1998) pp 455-60; G Roberts, *Evidence: Proof and Practice*, LBC (1998) p 514; Edmond and Mercer, note 1 *supra* at 57 and 60-1. Compare I Freckelton, *The Trial of the Expert*, Oxford University Press (1987) pp 59-60 and 167-74; I Freckelton, "Contemporary Comment: When Plight Makes Right - The Forensic Abuse Syndrome" (1994) 18 *Criminal Law Journal* 29; I Freckelton, "The Challenge of Junk Psychiatry, Psychology and Science: The Evolving Role of the Forensic Expert" in H Selby (ed), *Tomorrow's Law* (1995) 68; S Odgers and J Richardson, "Keeping Bad Science out of the Courtroom: Changes in American and Australian Expert Evidence Law" (1995) 18 *UNSWLJ* 108; J Bourke, "Misapplied Science: Unreliability in Scientific Test Evidence" (1993) 10 *Australian Bar Review* 123 at 145.

62 This was one of the issues considered in *US v Sinkey* 119 F3d 712 at 717 (8th Cir 1997), but that court maintained the use of "generally accepted accuracy and reliability".

(rhetorical) resources for excluding evidence.⁶³ But it also illustrates how close *Frye* and *Daubert* really are. Both depend upon degrees of acceptance; *Daubert* purportedly extends it to a higher level. Why this is necessary remains unclear. It also raises the issue of whether judges actually do, can or should make the type of assessment *Daubert* seems to expect of them. *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.

In the wake of *Daubert* and *Kumho*, what are Australian judges to do? One answer is nothing, or at least, not much.⁶⁴ *Daubert* and *Kumho* can be read as a response to a set of perceived social problems allegedly infecting the United States legal system. In those judgments, the Supreme Court inaugurated a more demanding admissibility regime based on one particular vision of the civil justice system. Significantly, this was a vision not shared by all of the protagonists. The features of other visions are largely absent from the Supreme Court's jurisprudence. Further, the relevance of that vision to Australia is highly questionable.

Another consideration that seems to have been raised by this reading of *Frye*, *Daubert* and *Kumho* is that if Australian judges are intending to raise or lower the admissibility standard, they should be held to explain that choice. The United States approach has been unsatisfactory because judges have attempted to alter the standard surreptitiously under the auspices of the largely unexplicated concept of *reliability* – effectively rewriting the United States Constitution by other means. Yet the standard of *reliability* is precisely what has changed. Any judicially led shift in admissibility standards should include a discussion of the possible effects on the operation of the legal system: the rights and duties of manufacturers and consumers, the capabilities of juries, access to litigation and the effects on the criminal justice system.

This is not to say that our current system cannot be improved, but it is not clear that ideal images of science (represented by a commitment to testing and the processes of peer review and publication),⁶⁵ engineering or non-science will improve the admission and assessment of expertise. 'Improve' is not a neutral move, it has to be assessed against some standard, against existing rights and interests. Similarly, *reliability* per se is not enough, unless placed in some context such as that provided by 'generally accepted' standards. Here again, the meaning of 'general' and 'acceptance' will require explication. In the United

63 G Edmond, note 9 *supra*.

64 This seems to be the approach encouraged by Chief Justice Gleeson, *HG v The Queen* [1999] HCA 2 (9 Feb 1999) where he indicated there was no need, at that time, to determine the relevance of *Daubert* for Australia.

65 The inconsistency between these criteria has been considered elsewhere: G Edmond and D Mercer, note 1 *supra* at 81-97; G Edmond, note 9 *supra* at 218-20 and 229-33; S Jasanoff, "Beyond Epistemology: Relativism and Engagement in the Politics of Science" (1996) 26 *Social Studies of Science* 393; G Edmond and D Mercer, "Representing the Sociology of Scientific Knowledge and Law" (1998) 19 *Science Communication* 307.

States, the use of these terms produces a range of, perhaps not insurmountable, problems.⁶⁶

Some examples, drawn from *Kumho* and other product liability litigation in the federal circuits, indicate how the fixation on testing (as a guide to *reliability*) has disadvantaged plaintiffs. In *Kumho*, the testimony of the plaintiffs' engineer, Carlson, was excluded even though the defendants had employed their own engineer, Dodson, who followed a roughly similar procedure. Both relied upon visual inspection of the tire to reach their different conclusions; both claimed this was industry practice, but Carlson's evidence was excluded. Whilst there were differences in some of the specific features of their testimony, these could well have been determined in court and it seems unconscionable to seek the exclusion of an opposition expert ostensibly relying upon 'similar' techniques and expertise.⁶⁷ Drawing upon the *Daubert* criteria, the District and Supreme Courts excluded Carlson's testimony because it had not been tested, even though visual inspection, and not testing, seems to have been the accepted technique used by manufacturers and engineers to determine the causes of tire failure under most circumstances.⁶⁸

In United States product liability litigation, testing has become a powerful weapon in the arsenal of defendants and judges. In a number of product liability cases focusing upon design deficiencies, federal courts have excluded evidence

66 P Giannelli, "The Admissibility of Novel Scientific Evidence: *Frye v. United States*, a Half-Century Later" (1980) 80 *Columbia Law Review* 1197; M McCormick, "Scientific Evidence: Defining a New Approach to Admissibility" (1982) 67 *Iowa Law Review* 879; J Osborne, "Judicial/Technical Assessment of Novel Scientific Evidence" (1990) *University of Illinois Law Review* 497; JP Kesan, "An Autopsy of Scientific Evidence in a Post-*Daubert* World" (1996) 84 *Georgetown Law Journal* 1985.

67 It is important to note that similarity-difference relationships between Carlson and Dodson were central to the debate over reliability. Carlson relied on a special methodology, which Dodson did not accept. Whether Carlson's personal methodology was sufficiently similar (or different) to industry practices as developed in the court to warrant admission was the type of issue to be resolved. Notably the plaintiffs and defendants made different representations of the field and standard practices. For a detailed account see briefs of Petitioners and Respondents. Judging and rationalising decision making routinely involves the use of such strategic representations: G Edmond, "Azaria's Accessories: The Social (Legal-Scientific) Construction of the Chamberlains' Guilt and Innocence" (1998) 22 *Melbourne University Law Review* 396.

68 One of the engineering briefs (Bobo *et al*) submitted in support of the Petitioners discussed a range of tests and inspections not utilised by Carlson. The engineer advising the brief, Bobo, specialised in aircraft tires and crash analysis. It was not clear that those routinely involved in assessing automobile tire failures performed the chemical tests and x-rays that Bobo associated with aircraft accident investigation. Further, during his deposition, Carlson's expertise was impugned because his experience was predominantly with truck tires. The relevance of Bobo's experience and the suitability of non-visual tests was part of the contested domain. See Brief *amici curiae* of Stephen N Bobo, Donald G Carter, William J Coad, Ernest L Daman, John D Graham, Nathan H Hurt, A Alan Moghissi, Francesco Pompei, James R Wallace and Richard Wilson in support of Petitioner, pp 18-21. Notably, Bobo's opinions appeared inconsistent with the affidavit of Baumgardner – who had worked for twenty seven years as a tire engineer with the Firestone Tire and Rubber Company – submitted along with the National Academy of Forensic Engineers' brief in support of the Respondents, pp 15-17.

because the engineers had not actually produced and tested alternative designs.⁶⁹ In some cases, such as military accidents, or costly medical products such as heart valves, the inability or reluctance of plaintiff experts to undertake these tests could prove dispositive. Further, such standards act to privilege manufacturers,⁷⁰ and their in-house experts, who tend to be among the best positioned to engage in and comment upon their designs and products. Their routine practices protect them from the science-for-litigation stigmatisation. If such a standard of testing were enforced, it could function to prevent a range of plaintiffs from entering the court, not to mention how manufacturers' 'control' of expertise might affect their liabilities and obligations to the public.⁷¹

Another related, though slightly more controversial consideration concerning expert evidence is whether we should retain the same standard of evidentiary reliability for all testimony, in all cases. If *reliability* is not seen as fixed, then maybe it can be tailored for specific contexts. For example, the reliability expected from state employed experts in a 'serious' criminal prosecution is presumably higher than the reliability required by experts for a plaintiff pursuing some 'minor' civil litigation. Similarly, and this gives some insight into the Supreme Court's concerns, in mass torts there might be far greater pressure to 'get it right' – producing a socially convincing outcome – than in an individual civil action. The stakes involved in some types of litigation, such as personal liberty (or life itself) or the viability of multibillion dollar corporations, requires especially careful judicial management. In part, this explains the strategic use and management of expert panels in the recent breast implant litigation in the United States. The degree of reliability, like relevance, can be determined *in situ*.⁷²

69 *Wheat v Pfize Inc* 31 F3d 340 at 343 (5th Cir 1994); *Habecker v Clark Equipment Co* 36 F3d 278 at 290 (3rd Cir 1994); *American & Foreign Ins Co v General Elec Co* 45 F3d 135 at 138-9 (6th Cir 1995); *Cook v America SS Co* 53 F3d 733 at 739-740 (6th Cir 1995); *Deiner v Cincinnati Zub-Zero Products Inc* 58 F3d 341 at 344-5 (7th Cir 1995); *Pestel v Vermeer Mfg Co* 64 F3d 382 at 384 (8th Cir 1995); *Anderson v FJ Little Machine Co* 68 F3d 1113 at 117 and 119 (8th Cir 1995); *Cummins v Lyle Industries* 93 F3d 362 at 367-71 (7th Cir 1996); *Peitzmeier v Hennessy Industries Inc* 97 F3d 293 at 297 (8th Cir 1996); *Smelser v Norfolk Southern Ry Co* 105 F3d 299 at 304 (6th Cir 1997); *Surace v Caterpillar Inc* 111 F3d 1039 at 1055-6 (3rd Cir 1997); *Watkins v Telsmith Inc* 121 F3d 984 at 989-93 (5th Cir 1997); *Dancy v Hyster Co* 127 F3d 649 at 651-2 (8th Cir 1997); *Michigan Millers Mut Ins Corp v Benfield* 140 F3d 915 at 921 (11th Cir 1998); *DePaepe v General Motors Corp* 141 F3d 715 at 720 (7th Cir 1998); *Bednar v Bassett Furniture Mfg Co Inc* 147 F3d 737 at 741 (8th Cir 1998).

70 In relation to the regulation of pharmaceuticals, consider, J Abraham, "Distributing the Benefit of the Doubt: Scientists, Regulators, and Drug Safety" (1994) 19 *Science, Technology & Human Values* 493; J Abraham, "Scientific Standards and Institutional Interests: Carcinogenic Risk Assessment of Benoxaproyen in the UK and the US" (1993) 23 *Social Studies of Science* 387.

71 The Court effectively glossed over this issue through their use of the same unexplicated concept of *reliability* in *Joiner*, note 5 *supra* at 520: "And it may, therefore, prove particularly important to see that judges fulfil their *Daubert* gatekeeping function, so that they help assure that the powerful engine of tort liability, which can generate strong financial incentives to reduce, or to eliminate, production, points towards the right substances and not destroy the wrong ones." The gatekeeping function is represented to facilitate the working of the tort system, but little consideration is given to how different standards of 'reliability' influence its operation.

72 Expert panels should not be conceived as problem free solutions to complex problems or expert disagreement. See S Jasanoff, "Expert Games in Silicone Gel Implant Litigation" in M Freeman and H Reece (eds), *Science in Court* (1998) 83.

The United States Supreme Court attempted to 'fix' their system surreptitiously on the basis of the need for an unexplicated, though demanding standard of *reliability*. If our courts perceive the need for change, they will hopefully articulate their reasons as well as the standard, remembering that there is no consensus in the scientific or social scientific communities about what makes scientific, let alone non-scientific expertise, special or *reliable*.⁷³ In the absence of such criteria, the continued use of qualifications, the existence of a field and some sensitivity to the prevalence and acceptance of practices, techniques and even conclusions seems preferable to idealised images which are as unworkable for scientists as they are for non-scientists, including judges. It might be tempting to argue that "[i]f the Australian system isn't broken then there's no need to fix it". But concerns over whether the system is 'broken' or can be 'improved' – 'fixed' – are situated. Shifts in admissibility standards alter not only business liability, but the substantial rights and duties of everyone.

Finally, in order to illustrate some of these contentions, I have provided an example drawn from the Australian Federal Court which provides some indication of the limits to the strict application of the central *Daubert* criteria: 'testing'.

A. An Easy Example: 'Testing' the *Ark of Noah* Hypothesis

In closing I hope to provide an example of both the complexities involved in testing, and how testing and disproof do not provide a uniform guide to scientific or expert practice. When they are used, they are inevitably guided by existing theory and assumptions (which are not always tested).⁷⁴ Significantly, the following example lacks many of the complexities involved in most contemporary litigation involving contested expertise. In that sense, it represents an *easy* case. The example is taken from the recent case of *Fasold v Robert* (the *Noah's Ark* case).⁷⁵ Specifically, the example explores attempts to disprove or test the hypothesis that Noah's Ark is resting on a mountain in eastern Turkey. Drawing upon social as much as so-called epistemological criteria, few people

73 Recently there has been some controversy between sections of the scientific communities and the social sciences and humanities. Some have understood this as a continuation of the division between the 'two cultures' described by CP Snow in *Two Cultures and the Scientific Revolution*, Cambridge University Press (1959). Others have seen it in a range of more sinister terms. For some examples and discussion consider: A Ross (ed), *Science Wars*, Duke University Press (1996); P Gross, N Levitt, M Lewis (eds), *The Flight from Science and Reason*, John Hopkins University Press (1997); A Sokal and J Bricmont, *Intellectual Impostures*, Profile Books (1998); S Hilgartner, "The Sokal Affair in Context" (1997) 22 *Science, Technology & Human Values* 506; D Mercer, "The Higher Moral Panic: Academic Scientism and its Quarrels with Science and Technology" (1999) 17 *Prometheus* 77; D Caudill, "Law and the Science Wars: Introduction to the Forum" (1999) 23 *Southern Illinois University Law Journal* 545.

74 TS Kuhn, *The Structure of Scientific Revolutions*, University of Chicago Press (1962); I Lakatos and A Musgrave (eds), *Criticism and the Growth of Knowledge*, Cambridge University Press (1970). For a critical discussion of testing, falsification and replication see H Collins, *Changing Order: Replication and Induction in Scientific Practice*, Sage Publications (1985).

75 (1997) Federal Court of Australia (Matter number NG942 of 1992); *David Fasold & Anor v Allen Roberts & Anor* [1997] 439 FCA (2 June 1997). For an analysis of images of science in the courtroom and the media coverage of the case see G Edmond and D Mercer, "Creating Science: Representing Science (and Law and Religion) in the *Noah's Ark* case" (1999) 8 *Public Understanding of Science* 317.

would encounter much difficulty distinguishing science from creationism. Yet the *Daubert* criteria provide limited assistance in supporting such perceptions, even though the criteria represent the kind of register and idealised images of science that scientists themselves tend to invoke in public settings.⁷⁶

In the *Noah's Ark* case, when pushed, a geologist from the University of Melbourne and a palaeontologist from the Australian Museum indicated that they had rejected the Ark hypothesis despite the absence of a *definitive* falsification ('test').⁷⁷ When asked by Justice Sackville what he would have to do in order to disprove convincingly the Ark hypothesis, the geologist responded – invoking an idealised model (here some form of Popperian falsification) of science – that he would need to take a number of core samples at the alleged site.

Justice Sackville: Do you remember yesterday I said to you that one of the criteria for science was whether a proposition was falsifiable – that is what Karl Popper says and that it is adopted in a great deal of work as I understand it is possible to falsify the theory that this is Noah's Ark or some human structure that exists under this area of Turkey and if so what would be needed to falsify it?... Geologist: I believe it's easily falsifiable, firstly on the age of the debris...

Justice Sackville: No, no, I am interested in if one wanted to falsify it what does one actually have to do?... Geologist: One would have to get a three dimensional view of the structure or material from the mud flow to falsify it. The material from the mudflow demonstrates the hypothesis can be falsified.

Justice Sackville: And has this been done?... Geologist: In my affidavit I record finding a golf tee and bits of plastic sticking out of the mudflow.

Justice Sackville: But what has this got to do with it?... Geologist: Because if Noah's Ark were to be 4000 years ago the ancient game from St Andrews could not yet have been around on the planet.

Justice Sackville: But I am more interested in what might have to be done by way of – let us assume that there could be some international venture undertaken with the co-operation of the Turkish government: what would need to be done – I do not want to know at the moment what you think arising out of what you have done, I just want to know what as a matter of investigation do you say could be done to falsify what I shall describe for present purposes as a hypothesis?... Geologist: One drill hole. One survey or one detailed sampling of the formation. One of those would falsify the hypothesis.⁷⁸

76 N Gilbert and M Mulkay, *Opening Pandora's Box: A Sociological Analysis of Scientists' Discourse*, Cambridge University Press (1984); M Mulkay and N Gilbert, "Putting Philosophy to Work: Karl Popper's Influence on Scientific Practice" (1981) 11 *Philosophy of the Social Sciences* 389; A Irwin and B Wynne (eds), *Misunderstanding Science? The Public Reconstruction of Science and Technology*, Cambridge University Press (1996); D Nelkin, *Selling Science*, Freeman (1987).

77 Whether an experiment constitutes a falsifying instance is the kind of issue that is often raised in controversies between scientists. For an introduction consider H Collins and T Pinch, *The Golem: What Everyone Should Know About Science*, Cambridge University Press (1993); H Collins note 74 *supra*.

78 *Fasold v Roberts* note 75 *supra* at 303 and 314-15. The geologist did visit the alleged resting place of the Ark, inspected the site and undertook some very preliminary excavations. However, he did not (and possibly could not) undertake more extensive investigations, such as taking core samples like those Bayraktutan had allegedly produced.

However, the geologist had not personally undertaken any of these. Instead he had, like scientists often justifiably do, relied upon informal exchanges and the guarantee of a partially discredited Turkish scientist (Bayraktutan).⁷⁹

Counsel: Having regard to his Honour's questions about falsification and having regard to the information you had about the core sample were you not curious about the results of the core sample?---Geologist: No, I'd had a discussion with Dr Bayraktutan and I knew exactly where he stood regarding the core sampling, access to it and his specialist scientific interpretation of the site.⁸⁰

Even though the geologist had not taken core samples of his own, nor seen one of those allegedly removed from the site, he was convinced that the site was not the resting place of Noah's Ark.

The testimony of the palaeontologist was even more revealing. Although he knew about falsification and testing, on the basis of other discipline-specific commitments, he saw them as largely irrelevant in relation to the Ark:

Palaeontologist: There's a – I'm trying to think, there's a supposition there that there was such a thing as Noah's Ark and the flood and the evidence for a geological flood was thrown out by most scientists in the 1830s and I don't see that we have to go back and keep reinventing the wheel for something that has been sort of - it's up to somebody to prove it's Noah's Ark. It's not up for some of us...

Neither of the scientists in the Noah's Ark case had undertaken the *necessary* falsification. The geologist relied upon the unpublished account of another scientist (Bayraktutan), the other dismissed the Ark on the basis of theoretical commitments underpinning the fields of geology and palaeontology.⁸² Notwithstanding the absence of the specified 'testing', all of this makes social sense. Even if the Ark hypothesis had not been falsified, the fact that fundamental assumptions entrenched in the long established fields of geology and biology are fundamentally incompatible should not be trivially dismissed. And not dismissed on the basis of idealised or abstract models of scientific practice. Strict adherence to the *Daubert* criteria can place scientists and judges in invidious positions.⁸³ A number of cases in the United States have demonstrated some of the difficulties associated with trying to demarcate science from creation science.⁸⁴ Although the example is unusual, it presumably provides an easier set of issues to resolve than most cases involving contested expert evidence. Most litigation does not involve creationists, astrologers or phrenologists. The circumstances and social commitments become more, not

79 Apparently Bayraktutan had offered another, inconsistent, account of the results of his excavations to a range of Christian Ark hunters in order to obtain fees to help fund his own research.

80 *Fasold v Roberts* note 75 *supra* at 304.

81 *Ibid* at 335-7.

82 Justice R Sackville, "Speech to Launch Vol. 20(1) of the *UNSWLJ*" (1997) 20 *UNSWLJ* 477.

83 Consider *In re Paoli RR Yard PCB Litigation* 35 F3d 717 at 758 (3rd Cir 1994).

84 *McLean v Arkansas Board of Education* 529 F Supp 1255 (ED Ark 1982) and *Edwards v Aguillard* 482 US 578; 107 S Ct 2573 (1987). For thoughtful commentaries consider: T Gieryn, G Bevens & S Zehr, "Professionalization of American Scientists: Public Science in the Creation/Evolution Trials" (1985) 50 *American Sociological Review* 392; P Quinn, "The Philosopher of Science as Expert Witness" in J Cushing, C Delaney and G Gutting (eds), *Science and Reality: Recent Work in the Philosophy of Science* (1984) 32; L Laudan, "Commentary on Ruse: Science at the Bar – Causes for Concern" in M LaFollette (ed), *Creationism, Science and the Law: The Arkansas Case* (1983) 161.

less, difficult to discern in the more regular disputes between epidemiologists, economists, anthropologists and medical doctors.

If reputable scientists have difficulty fulfilling, and sometimes understanding, idealised criteria like falsification, two observations seem to be in order. First, despite their having been championed in a variety of legal and non-legal circles, these criteria are probably not an accurate description of the framework guiding all or even most scientific, and especially non-scientific, practices. What such standards would mean for non-scientific expert evidence like economics, valuation, criminal mode of operation, is even less clear. Second, idealised images of science and a commitment to a single efficacious scientific method will raise refractory problems that can largely be circumvented by inquiries in the field. Where the interests or implications of the litigation are perceived to require sufficient attention, then parties and judges can seek more information. This might involve making inquiries or requesting the advice of professional, educational and regulatory bodies. Though, without some familiarity with the field, such advice should not be understood as disembodied or 'neutral'.⁸⁵

Whatever their merit, the approaches promoted by the US Supreme Court in *Daubert* and *Kumho* should not be conceived as rules carved in stone. Given that Court's apparent orientation to the United States legal landscape and a range of concerns arguably distinct from those in Australia (and possibly the United States), there seems little need, while the old gods remain 'faithful', to rush to build a golden calf.⁸⁶

Let us first await the deluge.

85 Professional organisations and bodies do not share the same interests nor have the same concern with 'fairness' or the appearance of 'neutrality' maintained by the judiciary. Judges should be cautious about professional bodies (and academics) with their own agendas, recommending a role for themselves. For example, the majority judgment in *Joiner* quoted the *New England Journal of Medicine* brief that was submitted on behalf of the defendant: "A judge could better fulfil this gatekeeper function if he or she had help from scientists. Judges should be strongly encouraged to make greater use of their inherent authority... to appoint experts... Reputable experts could be recommended to courts by established scientific organisations, such as the National Academy of Science or the American Association for the Advancement of Science" at note 5 *supra* at 521. Similarly, in *Kumho*, the National Academy of Engineering submitted a brief, in support of the defendants, as the peak body purporting to speak for all engineering. This was effectively a hegemonic claim. Notably, the National Academy of Forensic Engineers submitted a brief in support of the plaintiffs, with a very different representation of engineering (and law). Further, many of the mainstream organisations regularly involved in the submission of briefs and litigation, introduce subtle changes in their accounts and interpretations of law, science and non-science as the occasion demands. Compare the National Academy of Science brief submitted to *Edwards v Aguillard* (a creation science case), note 84 *supra*, with the National Academy of Science brief submitted in *Daubert*. On this point, few of the defendant briefs submitted in the *Daubert* appeal discussed gatekeeping and falsification, or the need for testing, before that judgment. Yet once these were infused with legal significance their use became synonymous with the definitions of proper engineering and science. Definitions of science are unavoidably tailored to specific contexts. For a recent discussion of this point consider T Gieryn, *Cultural Boundaries of Science: Credibility on the Line*, University of Chicago Press (1998), especially the chapter entitled "The US Congress Demarcates Natural Science and Social Science (Twice)". It is also worth contrasting the approaches to professional medical opinion and practice discussed in the Australian cases of *Rogers v Whitaker* (1992) 175 CLR 479 and *Naxakis v Western General Hospital* (1999) 162 ALR 540 with those pertaining to expert opinion evidence considered in *Joiner*, note 5 *supra* and *Kumho*, note 2 *supra*.

86 See G Teubner, "Legal Irritants: 'Good faith' in British Law or How Unifying Law Ends up in New Divergences" (1998) 61 *Modern Law Review* 11.