

ACCEPTANCE OF NOVEL SCIENTIFIC EVIDENCE

The Trial Judge as Gatekeeper

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INTRODUCTION

The courtroom has kept up as society has become more complicated- experts are frequent visitors. Opinion and expert evidence is available in broadening areas of enquiry. Scientific knowledge is expanding at a speed and to a depth that is impossible to keep up with. This knowledge is called upon to assist the trier of fact, but sometimes may mislead or be a waste of the court's time.

When such a witness offers "expertise" to a court, and where the existence of a sufficient body of learning to enable the witness to provide reliable conclusions cannot be assumed, it is necessary for the court to have careful regard to the integrity of the "science" that is being offered. If the scientific theory is not dependable, the opinions may be worthless or misleading¹.

The court must be wary of potentially undependable evidence, but it would be remiss to exclude cogent evidence only because it is new. Helpful evidence could be excluded if too strict a stringent a rule for exclusion of novel scientific evidence were employed. The irony is that the leading expert who is conducting cutting edge research may have his or her evidence excluded by rules that require reproducibility of the result. In the adversarial setting, it is fundamental that both sides be able to test and challenge the testimony, but too strict a rule may result in the exclusion of the best available scientific evidence.

ACCEPTANCE OF OPINION EVIDENCE

The starting point for understanding the courts' treatment of novel scientific evidence is to recall the rules for acceptance of opinion evidence.

Initially, opinion evidence was excluded as irrelevant: the court was interested in only the observations of the witness, not his or her conclusions or inferences drawn from that evidence. This proved difficult since life is not easily compartmentalized into observations and inferences [the defendant was impaired, the plaintiff is identified, for example]. Consequently the law developed to permit lay witnesses' opinion evidence when:

1. the witness has personal knowledge;

¹ Paciocco and Stuesser The Law of Evidence (Concord: Irwin, 1996) at page 123

2. the witness is in a better position than the trier of fact to form the opinion;
3. the witness has the necessary experiential capacity to make the conclusion;
4. the opinion is a compendious mode of speaking and the witness could not as accurately, adequately and with reasonable facility describe the facts she or he is testifying about.²

As the opinion gets closer to the ultimate issue, the tighter will be the reins on the evidence. "As the testimony shades towards a legal conclusion, resistance to admissibility develops."³

Experts were permitted to provide opinions in order to assist the jury with matters requiring expertise not within the ordinary person's experience, and without such assistance could not form a correct judgment.

Mr. Justice Dickson articulated the role of the expert in *R. v. Abbey*:

With respect to matters calling for special knowledge, an expert in the field may draw inferences and state his opinion. An expert's function is precisely this: to provide the judge and jury with a ready-made inference which the judge and jury, due to the technical nature of the facts, are unable to formulate. "An expert's opinion is admissible to furnish the Court with scientific information which is likely to be outside the experience and knowledge of a judge or jury. If on the proven facts a judge or jury can form their own conclusions without help, then the opinion of the expert is unnecessary" (Turner (1974), 60 Crim. App. R. 80, at p. 83, per Lawton L.J.)

An expert witness, like any other witness, may testify as to the veracity of facts of which he has first-hand experience, but this is not the main purpose of his or her testimony. An expert is there to give an opinion.⁴

The rules for the acceptance of an expert's opinion as evidence in the action were succinctly set out by the Supreme Court of Canada in *R. v Mohan*⁵:

Admission of expert evidence depends on the application of the following criteria:

² Paciocco and Stuesser, *The Law of Evidence* (Concord: Irwin, 1996) at 115 cited in Sopinka, Lederman and Bryant, *The Law of Evidence in Canada* (Markham: Butterworths, 1999) at 609

³ Sopinka et al, *The Law of Evidence in Canada* supra note 2 at page 609.

⁴ [1982] 2 SCR 24 at 42

⁵ [1994] 2 SCR 9 at paragraph 17

- (a) relevance;
- (b) necessity in assisting the trier of fact;
- (c) the absence of any exclusionary rule;
- (d) a properly qualified expert.

Paciocco and Stuesser⁶ summarize the meaning of the criteria as follows:

- Expert opinion evidence is “necessary” where it provides information likely to be outside the experience and knowledge of a judge or jury.
- The “relevance” inquiry requires a finding of both logical relevance and a determination that the benefits of the evidence (in terms of materiality, weight, and reliability) outweigh its costs (in terms of the risk that it may be accepted uncritically by the trier, its potential prejudicial effect, and the practical costs associated with its presentation).
- “Expertise” is a modest status achieved when the expert possesses special knowledge and experience going beyond that of the trier of fact.

*Taylor v Sawh*⁷ is the most recent civil case to reach the Ontario Court of Appeal to deal with the *Mohan* test. The court was called upon to deal with a trial judge’s ruling that an OPP accident reconstructionist was not permitted to offer an opinion on point of impact. While it decided that there was no miscarriage of justice in his failure to do so, the court disagreed with the trial judge and in so doing gave a good explanation through this example of the meanings of relevance, necessity and qualification:

As to Necessity:

The principal ground upon which the trial judge excluded Constable Thomas’ opinion as to the point of impact was necessity. In my view, the trial judge misdirected himself as to the meaning of necessity. **In the context of the admission of expert evidence, necessity refers to information that is likely to be outside the experience and knowledge of the jury. The opinion of a qualified expert does not become unnecessary simply because there may be other, even other more qualified experts, who will be testifying at the trial.** The same understanding of necessity applies in both criminal and civil cases. In *R. v. Mohan*, supra at pp. 23-24, Sopinka J. referred to civil and criminal decisions of the Supreme Court of Canada in explaining the necessity criterion:

⁶ supra Note 1 at p. 119

⁷ unreported, February 7, 2000

This pre-condition is often expressed in terms as to whether the evidence would be helpful to the trier of fact. **The word "helpful" is not quite appropriate and sets too low a standard.** However, I would not judge necessity by too strict a standard. *What is required is that the opinion be necessary in the sense that it provide information "which is likely to be outside the experience and knowledge of a judge or jury":* as quoted by Dickson J. in R. v. Abbey, supra.

As stated by Dickson J., *the evidence must be necessary to enable the trier of fact to appreciate the matters in issue due to their technical nature.* In Kelliher (Village of) v. Smith, [1931] S.C.R. 672, at p. 684 this Court, quoting from Beven on Negligence, (4th ed. 1928), at p. 141, stated that in order for expert evidence to be admissible, "[t]he **subject-matter of the inquiry must be such that ordinary people are unlikely to form a correct judgment about it, if unassisted by persons with special knowledge**". More recently, in R. v. Lavallee, supra, the above passages from Kelliher and Abbey were applied to admit expert evidence as to the state of mind of a "battered" woman. The judgment stressed that this was an area that is not understood by the average person. [Emphasis added.]

[19] The trial judge erred in excluding the officer's opinion because it did not meet the necessity criterion.

As to **prejudicial** effect [in weighing relevance criteria]:

[20] In the course of his reasons, the trial judge also stated that there was a potential danger of the prejudicial effect of the opinion evidence exceeding any possible benefit. In this context, the trial judge referred to the fact that the officer was not an engineer, that he had only spoken to Mr. Sawh after the accident, and that he could not say precisely when he submitted his report. In my view, none of these factors were grounds to exclude the opinion on the basis of prejudicial effect outweighing probative value. In R. v. Mohan at pp. 20-21, Sopinka J. discussed this balancing exercise under the relevancy criterion in the following terms:

Relevance is a threshold requirement for the admission of expert evidence as with all other evidence. Relevance is a matter to be decided by a judge as question of law. ***Although prima facie admissible if so related to a fact in issue that it tends to establish it, that does not end the inquiry. This merely determines the logical relevance of the evidence.*** Other considerations enter into the decision as to admissibility. This further inquiry may be described as a ***cost benefit analysis, that***

is "whether its value is worth what it costs": see McCormick on Evidence (3rd ed. 1984), at p. 544. Cost in this context is not used in its traditional economic sense but rather **in terms of its impact on the trial process. Evidence that is otherwise logically relevant may be excluded on this basis, if its probative value is overborne by its prejudicial effect, if it involves an inordinate amount of time which is not commensurate with its value or if it is misleading in the sense that its effect on the trier of fact, particularly a jury, is out of proportion to its reliability.** While frequently considered as an aspect of legal relevance, the exclusion of logically relevant evidence on these grounds is more properly regarded as a general exclusionary rule (see *Morris v. The Queen*, [1983] 2 S.C.R. 190). Whether it is treated as an aspect of relevance or an exclusionary rule, the effect is the same. The reliability versus effect factor has special significance in assessing the admissibility of expert evidence.

There is a danger that expert evidence will be misused and will distort the fact-finding process. Dressed up in scientific language which the jury does not easily understand and submitted through a witness of impressive antecedents, this evidence is apt to be accepted by the jury as being virtually infallible and as having more weight than it deserves. [Emphasis added.]

[21] Constable Thomas' evidence presented none of the concerns referred to by Sopinka J. His opinion was relatively straightforward. There was no danger that the jury would be misled by scientific language. The trial judge's decision to admit the opinion of two accident reconstructionists demonstrates this.

As to a **properly qualified** expert:

[21]...The fact that Constable Thomas was not an engineer was also not a basis for excluding his evidence. Witnesses can obtain the necessary expertise through training and experience. See *R. v. Dugandzic* (1981), 57 C.C.C. (2d) 517 (Ont. C.A.). In M. J. Freiman & M. L. Berenblut, *The Litigator's Guide to Expert Witnesses*, (Aurora, Ont.: Canada Law Book, 1997), in the chapter entitled "Motor Vehicle Accident Reconstruction", David Bender at p. 303 makes these comments about the way in which a person can become an expert: [excluded from this quote]

THE JUDGE'S ROLE AS GATEKEEPER IN CIVIL LITIGATION

In light of the increasingly important role of the expert in litigation, complexity of litigation and the burgeoning number of persons who claim expertise, the courts are faced with the potential of "junk science" and the

“hired gun” expert. Both Canada and the United States have responded with similar rules that assign the role of “gatekeeper” to the trial judge, **requiring the judge to prevent the admission of irrelevant, unreliable or misleading opinion evidence.**⁸

Initially this was the reason offered by the courts to exclude *any* expert opinion evidence: **the witness would be tempted to skew his or her opinion in favour of that of the person calling the evidence.**⁹

The gatekeeper role taken on by the trial judge is to distinguish between novel but reliable and helpful scientific evidence and “junk science”.

Recently the Courts have been formulating its role as gatekeeper with greater clarity. For example, and importantly, the duties of experts in civil cases have been articulated by the Court of Appeal in England¹⁰ in some detail:

- a. Expert evidence should be, and should be seen to be, the independent product of the expert uninfluenced as to form or content by the exigencies of litigation;
- b. An expert witness should provide independent assistance to the Court by way of an objective, unbiased opinion in relation to matters within his or her expertise. An expert should never assume the role of advocate;
- c. An expert witness should state the facts or assumption upon which his or her opinion is based. He or she should not omit to consider material facts which could detract from his or her concluded opinion;
- d. An expert should make it clear when a particular question or issue falls outside his or her expertise;
- e. If an expert’s opinion is not properly researched because he or she considers that insufficient data is available, then this must be stated with an indication that the opinion is no more than a provisional one. In cases where an expert witness who had prepared a report cannot assert the report contains the truth without some qualification, that qualification should be stated in the report;
- f. If, after exchanging reports, an expert changes his or her view on a material matter having read the other side’s expert’s report or for any other reason, such change of view should be communicated through legal representatives to the other side without delay and, when appropriate, to the Court;
- g. Where expert evidence refers to photographs, plans, calculations,

⁸ David M. Paciocco, “Context, Culture and the Law of Expert Evidence”, (2001) 24 *Advocates’ Quarterly*, 42

⁹ Sopinka et al supra note 2 at page 616

¹⁰ *National Justice Compania Naviera SA v. Prudential Life Assurance Co* (“The Ikarian Reefer”), [1993] 2 Lloyd’s Rep. 68 at 81; affirmed [1995] 1 Lloyd’s Rep. 455 (C.A.)

analyses, measurements, survey results or other similar documents, these must be provided to the other side at the same time as the exchange of reports.

The criteria set out above in *The Ikarian Reefer* have been applied to exclude the evidence of experts in a number of Canadian courts, including those of Ontario: *Fellowes, McNeil v. Kansa General International Insurance Co.* (1998), 40 O.R. (3d) 456 (O.C.G.D.) per E. Macdonald J.; *Baynton v. Rayner*, [1995] O.J. 1617 (O.C.G.D.) per Philp J.; *Amertek Inc. v. Canadian Commercial Corp.*, [2003] 229 DLR (4th) 419, O.J. 3177 per O’Driscoll J.. This is a significant development in the civil courts since heretofore the exclusion of expert evidence or screening role of the trial judge had only been exercised in criminal cases.¹¹

RULES FOR ACCEPTANCE OF NOVEL SCIENTIFIC EVIDENCE

What it comes down to is the application of the rules already set out above: those for the admission of expert opinion evidence [the *Mohan* test] and those articulated in *Ikarian*.

The American experience in grappling with the rules to be applied is instructive in that competing positions demonstrate the limitations in applying strict rules. Briefly, the *Frye* test would exclude scientific evidence if it was not generally accepted in a particular field. This is criticized as focusing on *consensus* [scientific nose-counting] as opposed to *reliability* in the *method* of reaching a conclusion [acceptance and application of the scientific method].¹² The Supreme Court of the United States in the famous *Daubert*¹³ decision set out a number of factors to be balanced in this product liability action, designed to determine if the evidence was both relevant and reliable.

This is similar to the test applied by the Supreme Court of Canada in *Mohan*: necessity, reliability, relevance and a properly qualified expert. Cases decided before the *Mohan* test was articulated should be approached with caution.

In dealing with novel scientific evidence, the Supreme Court of Canada explained that **“the relevance and reliability” tests are to be “undertaken with special scrutiny when applied to novel science and a basic threshold of reliability for the science or theory must be established by the party seeking to call the evidence.”**¹⁴

¹¹ See Eryou infra note 19 and Paciocco supra note 8 for further historical context

¹² See generally Paciocco, supra note 8, Paciocco and Stuesser, supra note 1 and Sopkina et al supra note 2 for discussions of the history of the development of the modern rules. Most helpful in my view is Professor Paciocco’s discussion in Context, Culture and the Law of Expert Evidence.

¹³ *Daubert v Merrel Dow Pharmaceuticals* 113 S. Ct. 2786 (1993)

¹⁴ Paciocco and Stuesser, supra note 1 at p. 124

Where an expert uses a “new scientific technique or body of scientific knowledge”, two other factors must be considered:

- a. Is the evidence likely to **assist the jury in its fact-finding mission, or is it likely to confuse and confound the jury**; and
- b. Is the jury likely to be overwhelmed by the “mystic infallibility” of the evidence, or **will the jury be able to keep an open mind and objectively assess the worth of the evidence?**¹⁵

The Ontario Court of Appeal applied and confirmed the Supreme Court’s requirement for **very strict scrutiny where novel science addresses the ultimate issue in the case**: *R. v. Pascoe* (1997), 32 O.R. (3d) 37 (C.A.). Later, in *R. v. A.K.*¹⁶, the Court of Appeal articulated a number of questions to address the issue of necessity:

- Will the expert’s testimony enable the trier of fact to appreciate the technicalities of the issue?
- Is the information outside the experience of the trier of fact?
- Is the trier of fact **unlikely to form a correct judgement about the issue without the assistance of the expert?**
- Does the need for the evidence outweigh any prejudicial effect?
- **Is there other admissible evidence which will enable the trier of fact to determine the issue?**
- Is the **level of complexity such that it is likely to confuse the trier of fact?**

Recently a trial judge noted that although a matter may be put before the court in accordance with the scientific method it may nonetheless not be necessary:

Any natural or unnatural phenomenon may be the subject of an investigation conducted according to the scientific method. The scientific method requires the formation of a hypothesis, the testing of the hypothesis using reliable methodology, the examination of the results (usually with statistical analysis), and the formation of a conclusion. However, **the fact that the testimony recites the application of the scientific method does not necessarily render the original object of study a matter requiring opinion evidence at trial.**¹⁷

In *R. v. J.L.J.*, [2000] 2 S.C.R. 600, the Supreme Court of Canada considered the *Mohan* test in a child sexual molestation criminal case. In its decision, the

¹⁵ *R. v. Melaragni* (1992), 73 C.C.C. (3d) 348 at 353 (Ont. Gen. Div.)

¹⁶ (1999) 45 O.R. (3d) 641 at 676-679 per Charron J.

¹⁷ *R. v. McIntosh* (1997), 35 O.R. (3d) 97 (C.A.), leave to appeal to S.C.C. dismissed March 19, 1998

Supreme Court confirmed that the *Mohan* test borrows from the US *Daubert* decision and made specific reference to its test. It also confirmed that science is not the answer in every case: ordinary experience may still be sufficient.

[31]...Nevertheless, the search for truth excludes expert evidence which may "distort the fact-finding process" (*Mohan*, at p. 21). To assist in the gatekeeper exercise, the Court established a list of criteria against which, on this appeal, the admissibility of Dr. Beltrami's evidence must be judged. For ease of exposition, I will address these criteria in a sequence that differs somewhat from that followed in *Mohan*.

1. Subject Matter of the Inquiry

¶ 30 In *Mohan*, Sopinka J., at p. 23, approved a passage from *Kelliher (Village of) v. Smith*, [1931] S.C.R. 672, at p. 684, that "[t]he subject-matter of the inquiry must be such that ordinary people are unlikely to form a correct judgment about it, if unassisted by persons with special knowledge". See also *R. v. Abbey*, [1982] 2 S.C.R. 24, per Dickson J., at p. 42; *R. v. Lavallee*, [1990] 1 S.C.R. 852, per Wilson J., at p. 896; and *McIntosh*, *supra*, per Finlayson J.A., at p. 392.

¶ 31 Dr. Beltrami's evidence satisfies this threshold requirement. In *R. v. McMillan* (1975), 23 C.C.C. (2d) 160, *aff'd* [1977] 2 S.C.R. 824, Martin J.A. of the Ontario Court of Appeal considered psychiatric evidence of disposition admissible "where the particular disposition or tendency in issue is characteristic of an abnormal group, the characteristics of which fall within the expertise of the psychiatrist" (p. 169 (emphasis added)). See also *R. v. Lupien*, [1970] S.C.R. 263; *McMillan*, *supra*; and *R. v. Robertson* (1975), 21 C.C.C. (2d) 385 (Ont. C.A.). This line of cases was approved in *Mohan* with the notation that the operative concept is "distinctive" rather than "abnormal", at p. 36:

In my opinion, the term "distinctive" more aptly defines the behavioural characteristics which are a pre-condition to the admission of this kind of evidence.

¶ 32 The exception is based on the notion that "psychical as well as physical characteristics may be relevant to identify the perpetrator of the crime" (*McMillan*, per Martin J.A., at p. 173), and "involves the psychiatrist in expressing his conclusion that the accused does not have the capacity to commit the crime with which he is charged" (*Lupien*, *supra*, per Ritchie J., at p. 278 (emphasis added)). This is clearly a proper subject matter for expert evidence. Whether or not the evidence tendered in this particular case is admissible remains to be established.

2. Novel Scientific Theory or Technique

¶ 33 Mohan kept the door open to novel science, rejecting the "general acceptance" test formulated in the United States in *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923), and moving in parallel with its replacement, the "reliable foundation" test more recently laid down by the U.S. Supreme Court in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993). While *Daubert* must be read in light of the specific text of the Federal Rules of Evidence, which differs from our own procedures, the U.S. Supreme Court did list a number of factors that could be helpful in evaluating the soundness of novel science (at pp. 593-94):

- (1) whether the theory or technique can be and has been tested:

Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry.

- (2) whether the theory or technique has been subjected to peer review and publication:

[S]ubmission to the scrutiny of the scientific community is a component of "good science," in part because it increases the likelihood that substantive flaws in methodology will be detected.

- (3) the known or potential rate of error or the existence of standards; and,

- (4) whether the theory or technique used has been generally accepted:

A "reliability assessment does not require, although it does permit, explicit identification of a relevant scientific [page616] community and an express determination of a particular degree of acceptance within that community."

...

Widespread acceptance can be an important factor in ruling particular evidence admissible, and "a known technique which has been able to attract only minimal support within the community," ... may properly be viewed with skepticism.

¶ 34 Thus, in the United States, as here, "general acceptance" is only one of several factors to be considered. A penile plethysmograph may not

yet be generally accepted as a forensic tool, but it may become so. A case-by-case evaluation of novel science is necessary in light of the changing nature of our scientific knowledge: it was once accepted by the highest authorities of the western world that the earth was flat.

¶ 35 In Mohan, Sopinka J. emphasized that "novel science" is subject to "special scrutiny", at p. 25:

In summary, therefore, it appears from the foregoing that expert evidence which advances a novel scientific theory or technique is subjected to special scrutiny to determine whether it meets a basic threshold of reliability and whether it is essential in the sense that the trier of fact will be unable to come to a satisfactory conclusion without the assistance of the expert.

Novel science has not been defined by the courts. Some guidance is provided by Prof. Paciocco¹⁸:

Although "novel science" is not defined, it is clear that the examination is not into whether the general field of study is novel, but whether the particular theory or technique being used is novel. The question is whether the particular application of the theories is novel...In determining whether expert evidence is novel, it appears that the pertinent question is whether those theories or techniques have gained general acceptance in their relevant field.

Generally, the degree of certainty expressed by the expert is irrelevant to the exercise of the role of gatekeeper. What carries the day is much the same as what carries the day in science: sound data, recognition of non-scientific factors, impeccable logical reasoning, articulation of sources of error and estimation of the cumulative probable error.¹⁹

METHOD OF DEALING WITH NOVEL SCIENTIFIC EVIDENCE

The trial judge will be required to hear sufficient evidence to determine reliability as a preliminary matter. The trial judge's inquiry must be restricted to determine whether the proposed scientific technique or theory has a foundation in science. This threshold test of reliability must remain capable of adaptation to changing circumstances and realities. It is met when the trial judge, having reviewed

¹⁸ supra note 8 at p. 46-47

¹⁹ David W. Eryou, "The Limits to Expertise", (The Advocates' Society Symposium: Advocacy in the 21st Century, Toronto: Advocates' Society, 2000) at page 4

certain evidence presented by counsel, feels that the novel scientific technique or theory is sufficiently reliable to be put to the jury for its review.²⁰

A *voire dire* may be required, in particular before a jury, if there is a serious dispute about the admissibility of the evidence.

²⁰ *R. v. Terceira* (1998), 38 O.R. (3d) 175 (C.A.) at 202-203; affirmed [1999] 3 S.C.R. 866