TECHNIQUES IN CROSSING THE SCIENTIFIC WITNESS

by

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"The general who wins the battle makes many calculations in his temple before the battle is fought. The general who loses makes but few calculations beforehand." - Sun Tzu, *Art of War*, approx 600 B.C.

"Cross-examination of an expert is a battle, not a skirmish. It requires marshalling of resources, exhaustive preparation, keenness of mind, total concentration and an ability to react quickly. Armed with only hours of preparation, the advocate must confront, challenge and discredit someone whose lifetime work it has been to master the subject in issue." - Ian A. Blue, Q.C. "Cross-Examining the Expert", http://heinonline.org/HOL/LandingPage?collection=journals&handle=hein.journals/aqrty7&div=8&id=&page=I

There is a wealth of writing on the glory and the art of, and techniques and legal principles for, cross-examining scientific expert witnesses. This paper is addressed to three techniques. The first two require preparation, slogging, and more preparation as opposed to any real brilliance. The third is more challenging.

1. Attacking qualifications and when;
2. Attacking underlying factual assumptions; and,
3. Exposing the opinion as a matter of judgment.

The paper also briefly touches on a fourth item: chain of custody issues for evidence tested by experts. For each of these themes, it also examines the underlying evidentiary principles because these are the starting point. The issue is always reduced to a practical result: is the evidence out or in and if so, what weight. Getting there, however, requires a consideration and framing with respect to the applicable evidentiary principles which are found in a series of Supreme Court of Canada cases involving abhorrent crimes and summarized in Sopinka¹.

Scientific experts tend to approach things differently than the courts. For

example, Sopinka characterizes scientists as distinguishing between validity (does the principle support what it purports to show), reliability (does the application produce consistent results); and accuracy (degree of conformance to the correct value or a standard) while judges and lawyers tend to “coble these distinct scientific concepts together”\(^2\).

**A. Expert Cross-Examination: General Principles**

“Cross-examination is not just an “art” but – like every other aspect of advocacy – a “discipline”. It is a discipline which every member of the legal profession should adopt in relation to the presentation of their cases and it involves, primarily, preparation. Only with proper preparation will the presentation follow.” - Robert Smith, Q.C., “Principles of Cross-Examination in Criminal Cases”

“Opinions, being the stock and trade of experts are by their very nature difficult to prove or disprove.” - Geoffrey D. E. Adair, On Trial – Advocacy Skills Law and Practice, 2nd ed, (Markham, LexisNexis Canada Inc., 2004) at 411.

“It is usually vain to suppose that the expert will be wholly discredited. The object is to cast doubt on the expert’s testimony so that one’s own expert is preferred.” - Sopinka et al, The Trial of Action, 2nd ed, (Markham, Butterworths Canada Ltd, 1998) at 98.

As general rule, expert evidence is an exception to the prohibition against testifying on matters of opinion. It is received in only those cases where a trier of fact is unable to reach their own conclusion without assistance from experts with special knowledge\(^3\). This is the now centuries old “modern rule”, that allows opinion evidence from witnesses who qualify as experts. The opinion evidence is only admissible because it is necessary to assist the fact finder to appreciate the facts due to their scientific or technical nature or to form a correct judgment on a matter if ordinary persons are unlikely to do so without the assistance of persons with special knowledge. The expert witness provides a ready-made inference for the trier of fact because the judge or jury does not have the knowledge or experience to draw the required

\(^2\) *Id*, note 1 at 807, para 12.86.

inferences from the evidence presented without assistance\textsuperscript{4}. In \textit{R. v. Abbey}\textsuperscript{5}, Justice Dickson, described an expert’s role as follows:

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 readymade 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 an expert is unnecessary.

The person proffering the expert has the burden of showing that the expert acquired special or peculiar knowledge through study or experience\textsuperscript{6}.

Admissibility of expert evidence is largely governed by the well established \textit{Mohan}\textsuperscript{7} test set out be the Supreme Court of Canada:

- the evidence is relevant to some issue in the proceedings;
- the evidence is necessary to assist the trier of fact;
- the evidence does not violate an exclusionary rule; and,
- the witness is a properly qualified expert.

A commonly expressed concern about admitting scientific opinion evidence is that fact finders may accept the opinion of experts due to their impressive credentials and mastery of scientific jargons. In \textit{Mohan}, Sopinka J. in reference to novel science stated:

Dressed up in scientific language which the jury does not readily 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.\textsuperscript{8}

Commentary in the literature and in the jurisprudence suggests that this issue is

\textsuperscript{4} Sopinka, \textit{supra}, note 1 at 819, para 12.123.
\textsuperscript{5} \textit{R. v. Abbey}, 2 S.C.R. 24 at 42.
\textsuperscript{7} \textit{Id.} at para 20, 27.
\textsuperscript{8} \textit{Id.}; and also Sopinka, \textit{supra}, note 1, at 814, para 12.108 and at 826, para 12.143.
not unique to juries and is also an issue for judges\textsuperscript{9}.

Recent amendments to the Federal Court Rules set out specific requirements for experts including signing a certificate acknowledging that the expert is bound to the code of conduct\textsuperscript{10}. The code of conduct requires \textit{inter alia} a description of qualifications on the issues addressed; the facts and assumptions on which the opinions are based; the literature or the material specifically relied on in support of the opinions; and any caveats or qualifications necessary to render the report complete and accurate including those relating to any insufficiency of data or research and an indication of any matters that fall outside the expert’s field.

While these were always fertile cross-examination grounds, the agreement to the code, and its potential violation, create an additional layer of cross-examination points. For example, if it is revealed during cross-examination that the expert omitted to state certain facts that were assumed, and those facts are not eventually proved (see below), the cross-examination has done two things: defused the evidence based on the assumed facts; and, shown the expert to be at best, less than careful, in failing to fulfill conditions that the acknowledged code required.

In addition to those discussed in this paper, the table below identifies aspects and tips for cross-examining experts. As described above, an additional area, based on the new Federal Courts Rules, is compliance with the code:

\begin{table}[h]
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\begin{tabular}{|c|c|}
\hline
Aspect & Tip for Cross-Examining Experts \\
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Compliance & Based on new Federal Courts Rules \\
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\textsuperscript{10} \textit{Federal Court Rules}, SOR/98, as amended SC2002, c.88, as amended, s. 52.2 and Schedule.
Points on Cross-Examining an Expert*

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<tr>
<td>• refute basic assumed or founded facts</td>
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<td>• if a factual foundation is sound then the</td>
<td>• bias</td>
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<td>theory of the expert should be attacked</td>
<td>• define and attack the facts and assumptions underlying the opinion</td>
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<td>• challenge the expert’s opinion or theory directly</td>
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<td>• examine the expert’s previous writings on the subject</td>
<td>• question the validity of the scientific research or methodology (or lack of same) supporting the opinion</td>
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<td>• cross-examine in plain English and force the expert to do same</td>
<td>• cross-examination on works of authority</td>
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<td>• demonstrate the opinion as a matter of judgment upon which reasonable professionals may differ</td>
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<td>• prior and inconsistent statements</td>
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*B Hinkson11 summarizes the points from these two texts in his paper in text format but uses an earlier Adair edition (p.265). The above table reflects the language and page references of the later 2nd edition.

B. When to Attack the Witness’ Qualifications

Seldom will an expert be presented who does not possess sufficient qualifications to entitle him or her to give opinion evidence on one subject or another. Cross-examination may appear to be a lost cause, especially in light of the low standard required to qualify as an expert witness. – Geoffrey D. E. Adair, *On Trial – Advocacy Skills Law and Practice*, 2nd ed, (Markham, LexisNexis Canada Inc., 2004) at 384.

The basic object of a cross-examination is not to score clever debating points. Like all evidence, its purpose is to persuade the trier of fact. This is the golden rule of cross-examination. - Sopinka et al, *The Trial of Action*, 2nd ed, (Markham, Butterworths Canada Ltd, 1998) at 90.

Given the low standard for admitting opinion evidence, unless there is a real issue on qualification, it is often prudent to not oppose that the witness is qualified for the identified subject matter. The risk is getting an adverse ruling, highlighting the actual expertise of the expert to the trier of fact, and wasting time and your own credibility. However, even if qualification *per se* is not challenged when they are tendered as experts, if is fair cross-examination to examine an expert’s credentials and

highlight deficiencies.

1. Legal Principles

One of the four Mohan criteria is that the expert is properly qualified. The expert witness must have acquired special knowledge beyond that of the trier of fact, through study or experience in respect of the matters in which he or she is to testify. As long as the witness is sufficiently experienced in the relevant area, whether derived from studies or practical training, the witness is properly qualified. The source of the expertise does not affect admissibility but it may go to weight. Deficiencies within an area go to weight of the evidence, not admissibility.

Whether an expert has the requisite qualifications is a matter of law. Without an objection, the literature and jurisprudence suggests that subsequent cross-examination on experts’ qualifications goes only to weight and not to admissibility.

The threshold for admissibility is generally low. While the expert’s evidence is to be confined to his or her area of expertise, if an expert gives evidence beyond that for which they were qualified in the proceeding, it is admissible if the “expert possesses special knowledge and expertise going beyond that of the trier of fact”.

There is also a distinction between witnesses with working knowledge of a specific area and a generalist with more knowledge than an ordinary trier of fact but

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13 R v. Marquard, id. at 255.

14 Id. at 243, citing J. Sopinka; S.N. Lederman & A.W. Bryant, The Law of Evidence in Canada (Toronto: Butterworths, 1992) at 536-537.

15 R. v. Abbey, supra, note 5.


lacks expertise in the specific subject matter\textsuperscript{18}. The evidence of an expert witness who only has general, rather than specific, knowledge of the art to which the patent relates will not be given much weight\textsuperscript{19}. One of the objectives of cross-examining on qualifications is to highlight this to the judge.

2. \textbf{Practical Considerations}

(a) \textit{Timing – ASAP}

Objections to qualifications should be raised as early as possible and before the expert’s substantive testimony. The Federal Courts Rules require an objection of this nature “as early as possible in the proceeding” and prescribe filing and serving a document with the particulars and basis of the objection or in accordance with the pre-trial rules if known at that time\textsuperscript{20}.

Often, in accordance with a schedule hammered out at a pre-trial, there will be dates for exchanging expert witness qualifications followed by any objections to qualifications including the basis for the objection. If there are objections, disputes are generally addressed when the witness is tendered at trial through a \textit{voir dire}.

While an objection should be made, at the latest, during the qualification stage, it can also be during the witnesses’ testimony if it becomes apparent that the expert is testifying beyond their expertise\textsuperscript{21}.

If there is no pre-agreed schedule, the objection should be made when the expert witness is tendered to the Court. If there is an objection, the trial judge must conduct a

\textsuperscript{18} Sopinka, supra, note 1, at 821, para 12.129; and, R v. Marquard, [1993] 4 SCR 233.


\textsuperscript{20} Federal Courts Rules, SOR 98/106 as amended, Rule 52.5, 262.

\textsuperscript{21} R v. Marquard, supra, note 12, at 243-244.
voir dire to determine the witnesses’ qualifications and admissibility of the opinion evidence. The opposing counsel cross-examines on the qualifications for the Court to determine if the expert can testify and any restrictions.

(b) More harm than benefit?

One always needs to be concerned in attacking qualifications as to whether bolstering the credibility of the witness in the eyes of the trial judge. Adair suggests cross-examination if any of the following instances:

- to show the witness does not really possess special knowledge within a particular field;
- the witness does not qualify as a “true expert”; this will serve to diminish the weight;
- the proposed subject matter is such that it will not be of any real assistance to the court.

(c) Common grounds of attack

Whether attacking qualifications for admissibility, or cross-examining on credentials for weight, common grounds of attack to qualifications in a patent trial are that the expert does not have proper qualifications in the skill set attributed to the person skilled in the art in the proceedings; or that they were not qualified at the relevant time (this goes to weight rather than admissibility):

Some of the evidence given by the experts bearing upon the state of the art, what for brevity I have called the radio art, at a time when they were practitioners in that art, and are, therefore, competent to speak about it, is not only admissible but of weight and value. Some of it, although, perhaps technically admissible, given by the witnesses in relation to the state of the art at a time when they had not much more than entered upon their studies as engineering students, is of no value. Some of it ought never to have been given.


On the timing criteria, if the expert has sufficiently studied the materials existing at a prior time, even if it was before they were qualified, the evidence is admissible: deficiencies go to weight.

The starting point for an attack is combing through the *curriculum vitae*.

For publications and presentations, one can look to see if the expert ever published in the area at issue; if they did, was it within the right time frame; if it is, what journals were the publications in: are they peer reviewed, are they the leading journals for that profession, is the expert a member of the peer review panel; and, are there any letters to the editor criticizing the publication? Similarly, for presentations, were they given at the leading industry conferences or meetings? An electronic search should also be done to find writings, interviews and previous testimony of the expert or about the expert that can be used in cross-examination.

Another area to consider is whether the expert has real work experience or is the expert purely academic or purely a researcher. It is also useful to note whether they studied in a leading institution in the field and with whom (did they study with leaders in the field).

C. **Attacking the Factual Assumptions Underlying the Opinion**

“Time and again trial judges discard expert opinions on the basis that either the underlying facts cannot be accepted or the expert is unaware of certain material facts”. – Geoffrey D. E. Adair, *On Trial – Advocacy Skills Law and Practice*, 2nd ed, (Markham, LexisNexis Canada Inc., 2004) at 365.

An effective way to destroy the usefulness of an expert opinion is to knock out the factual assumptions which underlie the opinion. It is your job to alert the court to any significant instance where the expert is misinformed, has omitted relevant facts, or the facts have not been proven.

Expert evidence based on assumptions is not relevant if the underlying factual assumptions cannot be proved. An expert cannot testify his or her opinion without
explaining the facts or data upon which the opinion is based. It cannot be left to the other side to elicit on cross-examination\textsuperscript{24}. The expert opinion is only as strong as the underlying factual basis. Opinion evidence is worthless, and arguably irrelevant, if there is an absence of factual foundation for the opinion.

It is often the case that experts are testifying with respect to finding a fact that still needs to be made by the judge. Care must be taken to ensure the expert's opinion is understood as being contingent on certain finding of facts, for the proffering party and the cross-examiner. A way to deal with this, still in common use, is by eliciting the opinion on a hypothetical\textsuperscript{25}.

Drawing clear legal principles from the cases can be a challenge because in the end, it comes down to the nature of the facts not proved and further, whether the issue is one of admissibility or weight. Some cases say the expert opinion is admissible without the underlying facts but it goes to weight\textsuperscript{26}. At the same time, if the factual premise on which the opinion was based is rejected by the trier of fact, the experts’ opinion must be rejected as well\textsuperscript{27}. Further, even if the expert opinion is admissible, the data cannot be assumed to have been proven\textsuperscript{28}.

This is also interwoven with this issue the hearsay rules since some evidence provided by the expert may come in as exceptions to the hearsay rules. In this class of underlying factual evidence, the leading cases, decided before the general principled approach on hearsay evidence, distinguish between hearsay information that regularly forms massive material upon which an expert relies in the course of his or her expertise

\begin{footnotesize}
\textsuperscript{27} Sopinka, supra, note 1, at 825, para 12.138.
\end{footnotesize}
or whether it is hearsay going directly to a matter in issue and comes from a source that is inherently suspect. An example of the first type is below:

A doctor, chemist, professional man or any other person who qualifies as an expert is not confined to opinions based solely on his personal experience of observation, but may draw on information obtained from lectures during his education in his particular field, textbooks, as well as from discussions with other persons learned in the same field. The weight to be given to any opinion is always a matter for the consideration of the trial Judge.

Therefore, while the principle that expert opinion evidence can be based on hearsay information that was not proven at trial is sound, it is useful to look at the nature of the hearsay and whether it is reliable. Sopinka comments that at some point an opinion based on inadmissible hearsay is going to reach the “vanishing point”.

D. Exposing the Opinion as Being a Matter of Judgment

As a tactic of last resort, the cross-examiner may be able to extract from the expert the concession that his or her opinion is one upon which respected competent professionals in that field of expertise may disagree as it is a matter of professional judgment or opinion. – Geoffrey D. E. Adair, On Trial – Advocacy Skills Law and Practice, 2nd ed, (Markham, LexisNexis Canada Inc., 2004) at 439.

Opinions are a matter of judgment. A good technique can be to put a range of scenarios or range of theories within the profession to the expert to and elicit that there are a range of reasonable answers and that this expert is just one such range. The expert can be asked to explain the differences and where warranted, discuss the leading experts in the profession who hold these different views, all to show that differences of opinion may reasonably be held.

29 Sopinka, supra, note 1, at 834-855 including 840 at para 12.173.


31 Id., at 848, para 12.190.
A caution that this involves a much more difficult task than attacking qualifications or factual assumptions. This requires a complete understanding of the concepts, and going toe to toe with an expert on their own turf. You need to be educated and need to use your experts to do so. In this area it is helpful to carefully and critically review the expert’s previous writings including any other testimony and look for differences. As well, the overall effectiveness of this strategy can depend on burdens and who has the burden to prove that point.

E. Chain of Custody

Chain of custody is required where an official continuation of possession to establish the item relevant to the hearing is the same item that is the subject of expert testimony. For example, if the testing involves either the patentee or the infringer’s tablet tested by an expert without admissions (Notice to Admit/Discovery), such as in a PMNOC proceeding, evidence should be provided to establish the chain of custody. The samples must be shown to be authentic, unadulterated, and not subjected to conditions which could affect the testing from the time the sample was taken to the time it was tested. Typically a chain of custody / continuation of possession evidence are necessary to establish location and handling and care of the object from the date of acquisition to the date of testing. There are also other issues associated with the showing that is in fact a sample taken from a party and that it is representative.

Test results can be invalidated by mishandling, tampering, alternation or contamination or not ruling out the possibility of substitution.

It is necessary to show what measures were taken to safeguard the condition of the sample from the time it was acquired until the time it was tested. This is often done through sealed and labeled containers.

F. Conclusions


“It is rare that one confronts the unassailable witness.” - Sopinka et al, *The Trial of Action, 2nd ed*, (Markham, Butterworths Canada Ltd, 1998) at 89.

While cross-examining an expert is one of the most formidable tasks facing patent counsel, there is hope. Development of a detailed outline and thorough preparation for the cross-examination are effective ways to even the playing field and to cast doubt on an expert’s evidence. This paper discusses three of many classic strategies for cross-examining experts. Two of these strategies are well within the ordinary skill set of even junior lawyers and require more patience and diligence than experience: a meticulous review of the expert’s qualifications including publications and presentations to diminish (or, if possible, destroy) their qualifications; and understanding the factual basis and assumptions of the expert’s opinion and where it is vulnerable. The third strategy of highlighting that the opinion is a matter of judgment and there are more than one reasonable views is better executed by experienced counsel knowledgeable about the art with the assistance of his or her own experts.

The key overall message is to prepare as much as possible, to proceed carefully and to control the witness. As with your own experts, applying Leonardo da Vinci’s adage that “simplicity is the ultimate sophistication” can help shape a winning cross-examination.