

**Task Number:****Article Title:** The challenges of scientific evidence – Macfadyen lecture (17 pages)**Date Published:** 2<sup>nd</sup> March 2011**Author:** Honorable Thomas A. Cromwell

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**Article's Subject Matter:**

- Courtroom encounters between law and science have resulted in miscarriages of justice in Canada, US and UK courtrooms. This article provides a review of the law in Canada, US and UK and the various reforms concerning expert and scientific evidence in an attempt to answer the question: how well is the law meeting the challenges posed by scientific evidence?

**Key Points in Article****Doctrinal foundations - Opinion rule:**

- Witnesses only give evidence on matters of fact, not on their opinions. Distinction between fact and opinion often unclear and lead to the 'modern opinion rule' that permits witnesses to testify to their perception of relevant events and not to their factual conclusions or inferences.
- Exceptions
  - Law permits evidence in the form of opinions where the matters observed are conclusions reached in everyday life i.e. eye-witness identifications.
  - Expert evidence is permitted from a witness with special knowledge or skill when judges and juries are ill-equipped to draw "true inferences".
- Problems relate to the content, in technical evidence of all kinds, and not merely opinions. The response of the law of evidence to the challenge of scientific evidence is not well-suited to addressing such challenges.
- Expert opinion rule has 2 components:
  - Threshold of necessity - qualified persons provide opinions on matters which ordinary person is unlikely to appreciate due to technical nature.
  - Qualifications – the expert must have special knowledge gained through study or experience. Opinion must be confined to area of expertise.

**Gatekeeper role:**

- US law concerned with the accuracy of the science underlying the expert's testimony:
  - Frye v. US requires general acceptance of scientific principles/ discoveries within a discipline. Frye not generally applied in Canadian evidence law.
  - US Federal Rules of Evidence (#702) and R v. Trochym (Canada) is concerned with the reliability of the science which underlies the evidence.

- US gate-keeping role – the trial judge must assess whether the reasoning or methodology, underlying the testimony is scientifically valid and whether it has been properly applied to the facts at issue.
- In Canada, R v Mohan requires trial judges to test expert evidence for admissibility in a voir dire using: 1) relevant, 2) necessary, 3) exclusionary rule, and 4) properly qualified expert. Reliability is considered in relation to 1, 2 and 4.
- R v. J.-L.J., required trial judge to assess admissibility of expert evidence using the Daubert factors of testing, peer-review, known or potential error rate and general acceptance.
- Voir dire is governed by principles of adversarial procedure and thus the gate-keeper role is largely dependent on the parties providing the court with the material necessary to do so – judges feel this is often not the case.
- Scottish courts admit scientific evidence provided it is rooted in a recognized body of knowledge and otherwise do not screen for threshold reliability of the science or technique and the primary focus is on the experts expertise rather than the underlying science.

### Miscarriages of Justice & Expert Evidence

#### Canada:

- Kaufman Inquiry – murder of Christine Jessop (1984), Guy-Paul Morin convicted based on microscopically similar hair to Morin’s hair that “could have” come from him. Later 2 classmates revealed to have hairs that were microscopically similar. Commission noted that hair comparison evidence lacked probative value and that the forensic scientist failed to accurately communicate limitations of the findings to police. Fibres collected from the victim’s clothing and Morin’s car/ residence were similar and could have come from the same source. Commission found evidence had no probative value and there existed the possibility of “in-house contamination” within the forensic laboratory. Report recommendations (34) included comprehensive guidelines for writing forensic reports.
- Goudge Inquiry – systematic review and assessment of the practice of paediatric forensic pathology in Ontario revealed major problems with Dr. Charles Smith’s expert reports and testimony. Several criminal cases have been re-opened and convictions reversed. The expert evidence was shown to have many failings including lack of impartiality, overstating knowledge, unscientific evidence based on own experiences, use of unscientific language, testimony outside of area of expertise.

#### England & Wales:

- Clark appeal - Sally Clark convicted of murder of 2 sons. Dr Williams concluded bruises on Christopher resulted from resuscitation attempts, but after concluding that the death of second son, Harry, was due to shaking, Dr. Williams decided that Christopher’s death was unnatural. Statistics indicated that the chance of children dying naturally in these circumstances was 1 in 73 million. Fundamental scientific errors were described in slide preparation during Harry’s autopsy and that Williams failed to disclose microbiological tests on Harry’s samples which indicated bacteria. Court of Appeal viewed statistical evidence to be grossly overstated. The

convictions were reversed and an interdepartmental group examined other cases involving Dr Williams.

Scotland:

- Shirley McKie Case – David Ashbury convicted of murder of Marion Ross when the Scottish Criminal Records Office (SCRO) found the deceased's fingerprint (Q12) on a tin located at his residence. Shirley McKie, a police officer on the murder investigation team, tried for perjury after she testified that fingerprint (Y7) found on Ms. Ross's bathroom doorframe was not hers. Two independent fingerprint experts concluded that Y7 did not belong to Ms McKie and she was acquitted. Ashbury conviction reversed when independent fingerprint experts advised that Q12 did not match Ms Ross. A parliamentary inquiry into SCRO found it staggering that respected and highly experienced experts held such widely divergent professional opinions. There appears to be no agreement on the way in which dissimilarities between marks are accounted for.

These examples are illuminating because;

1. Careful gate-keeping could have shown that the evidence lacked a proper scientific basis.
2. Gate-keeping role practiced within US and Canada would not have been sufficient since it detects problems with the science and not the expert.
3. Not confined to novel science. Well-accepted scientific techniques i.e. fingerprint evidence require on-going assessment of the reliability of the science and appropriateness of its application.

Meeting the challenges

Recurring problems include the use of preliminary tests as conclusive evidence, the failure to identify or disclose procedural errors in use of scientific methods or tests, misinterpretation or misunderstanding of the significance of findings, experts going beyond their area of expertise, experts not explaining their findings or uncertainties in the science in clear, impartial manner. Experts have failed to apply the basic research methods of science and that the courts have failed to question the science and the opinion.

The Goudge Commission of Inquiry (Canada), the Law Commission Consultation Paper (UK), the National Academy of Science (NAS) Report (US) and the pending Fingerprint Inquiry (Scotland) have addressed aspects of these problems. The main approaches include;

Expert impartiality

- "Duties and responsibilities of expert witnesses in civil cases include the following [1]:
  1. 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...
  2. An expert witness should provide independent assistance to the Court by way of objective unbiased opinion in relation to matters within his expertise...An expert witness ... should never assume the role of an advocate.

3. An expert witness should state the facts or assumption upon which his opinion is based. He should not omit to consider material facts which could detract from his concluded opinion...
  4. An expert witness should make it clear when a particular question or issue falls outside his expertise.
  5. If an expert's opinion is not properly researched because he 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 has prepared a report could not assert that the report contained the truth, the whole truth and nothing but the truth without some qualification, that qualification should be stated in the report..."
- In Ontario, rules require an expert to provide opinion evidence that is fair, objective, non-partisan and within area of expertise.
  - Concept of independence also adopted in England and Wales (Part 35 of the Civil Procedure Rules, and Part 33 of the Criminal Procedure Rules). In Scotland, the Code of Practice for Expert Witnesses requires experts to act independently but the Rules of Court are not as explicit as in Canada, England and Wales.
  - Independence of the forensic facilities and institutions is a concern: NAS Report recommended removal from police control whilst a Canadian inquiry suggests that this could be counter-productive [2].

#### Quality Control

- Recent reports and studies (NAS Report) address many ways in which the quality of expert testimony could be monitored and improved including accreditation.
- Problems associated with expert evidence may be rooted in lack of familiarity with legal and courtroom processes.
- Ontario Rules require experts to set out qualifications and educational experiences in their report. Also require report to explain range of opinions on issues and the reasons for the expert's own opinion. Also required by England and Wales.

#### Improving Judges Scientific Literacy

- Judges must have some understanding of scientific culture to ask the right questions in order to perform the gate-keeping role.
- US Reference Manual on Scientific Evidence designed to identify pivotal issues.
- In Canada, the National Judicial Institute (NJI) offers specialized programs to understand principles of scientific investigations and scientific evidence. NJI developed a list of important questions that judges should ask themselves in considering reliability of scientific evidence;
  1. Is the evidence science?
    - a. Are there first hand observations made about facts?
    - b. Are these observations reliable in the sense that they are precisely defined, in precise context and reproducible?
    - c. Are there clear criteria for acceptance and rejection of results?
  2. Is the methodology, application, process or technique unusual, disputed or new?
  3. Is the proposed evidence good science?

- a. Is what is being observed adequately linked to what is being reasoned? (Construct validity).
  - b. Are there equally plausible alternative conclusions? (Internal validity).
  - c. Do the observations always measure the same thing? Have they been replicated? Is there corroboration? (Reliability in the scientific sense). Are the conclusions generally applicable to other situations? (External validity).
4. Is the evidence reliable in the legal sense?
    - a. Does the technique do what it purports to do?
    - b. Is this witness capable of applying these techniques?
    - c. Has the witness properly applied the technique in this instance?

### Conclusions

- Even rigorous admissibility standards are not sufficient to address challenges posed by scientific and technical evidence.
- Clear professional standards, appropriate training, credentialing and quality control for expert witnesses could address problems arising from the evidence of unqualified, careless, overworked or unscrupulous experts.
- The legal profession and judiciary must improve their scientific literacy.

References – several references provided but these two would be worth reading.

- [1] National Justice Compania Naviera SA v Prudential Assurance Co Ltd [1993] 2 Lloyd's Rep 68.
- [2] Sangha, B, Roach, K and Moles, R, Forensic Investigations and Miscarriages of Justice: The Rhetoric meets the Reality (Irwin Law Inc., Toronto, 2010) p369-71.

### Fallacies and Issues

- By observing differences between Canada, the US and the UK along with the resultant miscarriages of justice, Hon Thomas Cromwell, points out that judiciary must also focus on the reliability of the expert and that even well established practices such as fingerprints need on-going assessment.
- Interesting that a Canadian review in 2010 found that separating the forensic science and identification functions from the police services would be counter-productive which is in contrast to the NAS report recommendation.
- Useful for forensic identification specialists to be aware of the training that the legal community is undertaking to be better prepared for scientific and technical evidence especially the phrasing of questions relating to reliability of the expert and the science.