JUDICIAL ASSESSMENT OF EXPERT EVIDENCE

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INTRODUCTION

While the test for admissibility of expert evidence differs from jurisdiction to jurisdiction, judges in all jurisdictions face the common responsibility of weighing expert evidence and determining its probative value. This is no easy task. Expert opinions are admissible to furnish courts with information which is likely to be outside their experience and knowledge. The evidence of experts has proliferated in modern litigation and is often determinative of one or more central issues in a case.[1] Without it judges could not hope to determine where truth lies. Yet expert evidence presents its own hazards. The phenomenon of the "hired gun" expert is well known. Particular experts become associated with certain positions and accordingly are called by the parties seeking to establish that position. Opposing experts are then called by the opposing parties.[2] The disparities in the evidence of experts within the same discipline are notorious, ineluctably favouring the party who has instructed them. As a result, judges sometimes suggest that the courts should be prepared, where appropriate, to approach the evidence of experts with "a healthy scepticism"[3] or "with reserve and scepticism".[4]

Expert testimony, like all other evidence, must be given only appropriate weight. It must be as influential in the overall decision-making process as it deserves: no more, no less. This article seeks to identify the criteria which judges use to weigh the probative value of expert evidence. Some of these

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[1] *State v. Pearson and Others* (1961) 260 Minn. 477.

[2] McLachlin, "Judging in a Democratic State", Sixth Templeton Lecture on Democracy, University of Manitoba, Winnipeg, 3 June 2004.

[3] *R v. Griffin* [2001] 3 N.Z.L.R. 577.

[4] *Tomislav Lipovac Bhnf Maria Lipovac v. Hamilton Holdings Pty Ltd and others* [1996] A.C.T.S.C. 98.

criteria are applicable in all cases; others only in some, depending on the nature of expert evidence which has been called[5] and what other evidence has been offered. Certain of the criteria are interrelated and overlap. No single criterion is determinative. Some of the criteria are particular to expert evidence alone; others are used to assess the weight of all witness testimony. The article illustrates how judges have applied these criteria in weighing expert evidence in order to demonstrate how they operate in practice.

I. THE CONTEXT OF ALL OTHER EVIDENCE

The weight to be given to expert evidence will derive from how that evidence is assessed in the context of all other evidence. This is because, while expert evidence is important evidence, it is nevertheless merely part of the evidence which a court has to take into account.[6] Four consequences flow from this.

Firstly, expert evidence does not "trump all other evidence".[7] It is axiomatic that judges are entitled to disagree

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[5] Courts have distinguished between different types of evidence offered by expert witnesses. In *The Torenia* [1983] 2 Lloyd's Rep. 210 Hobhouse J. identified different evidential categories. Firstly, evidence is adduced which can be described as direct factual evidence which bears directly on the facts of the case. Secondly, opinion evidence is given with regard to those facts as they have been proved; and thirdly, evidence, which might be described as factual, is used to support or contradict the opinion evidence. This is evidence which is commonly given by experts, because in giving their evidence they rely upon their experience, and they refer to that experience in their evidence. So an expert may say what he has observed in other cases and what these have taught him for the evaluation of the facts of a particular case. Similarly, experts give evidence about experiments which they have carried out in the past or which they have carried out for the purposes of their evidence in the particular case in question. In *Harrington-Smith v. Western Australia (No.7)* [2003] F.C.A. 893 Lindgren J. suggested four categories: expert opinion evidence, expert non-opinion evidence, non-expert opinion evidence, and (implicitly) non-expert non-opinion evidence. It may be the difficult to apply the concept of "opinion" to certain evidence which may amount to an analysis, synthesis and summary of factual material.

[6] *Huntley (also known as Hopkins) (a protected party by his litigation friend, McClure) v. Simmons* [2010] E.W.C.A. Civ 54.

[7] *Woodhouse v. Britannic Assurance p.l.c.*, Employment Appeal Tribunal, U.K.E.A.T. 0132/03/RN para. 25.

with an expert witness.[8] Expert evidence should be tested against known facts, as it is the primary factual evidence which is of the greatest importance. It is therefore necessary to ensure that expert evidence is not elevated into a fixed framework or formula, against which actions are then to be rigidly judged with a mathematical precision.[9] In *HKSAR v. Chan Sze Pui*[10] the defendant switched the price label on a box of DVDs with that of a cheaper box. She paid the cheaper price and then left the shop. At her trial she testified she had heard a voice in her mind telling her to do so. The defence called a psychiatrist whose opinion was that she was suffering from obsessive-compulsive disorder and a major depressive disorder. On appeal against conviction it was held that a court is not compelled to accept the evidence of an expert but is entitled to accept or reject that evidence like any other, bearing in mind the whole of the evidence in the case. The court had placed the expert testimony in the context of the whole of the evidence and determined what weight could be placed upon it. It was entitled to make findings as to whether the symptoms the expert said would be present, and the distress that the defendant said she experienced, were to be seen on the surveillance video. The court found that the signs of obsessive-compulsive behaviour given by the expert, such as handing-washing, checking, and counting, were absent at the material time.

Secondly, a judge must not consider expert evidence in a vacuum.[11] It should not therefore be "artificially separated" from the rest of the evidence. To do so is a structural failing.[12] A court's findings will often derive from an interaction of its views on the factual and the expert evidence taken together. The more persuasive elements of the factual evidence will assist the court in forming its views on the expert testimony and *vice*

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[8] *AB v. BG and Others* [2009] E.W.C.A. Civ. 10. This proposition also has an equally obvious corollary. There must be material upon which the judge in question can safely found his disagreement, and he must fully explain the reasons for rejecting the expert's evidence.

[9] *Stewart v. Glaze* [2009] E.W.H.C. 704.

[10] *HKSAR v. Chan Sze Pui, Gloria* [2004] H.K.C.U. 298.

[11] *Wang Din Shin v. Nina Kung* [2004] H.K.C.U. 730.

[12] *HE (DRC – Credibility and Psychiatric Reports)* [2004] U.K.I.A.T. 00321.

versa.[13] For example, expert evidence can provide a framework for the consideration of other evidence. In *Mibanga v. Secretary of State for the Home Department*,[14] an asylum case, the court said that experts, whether in relation to medical matters or in relation to in-country circumstances, offered a factual context in which it might be necessary for the fact-finder to survey the allegations placed before them; and such context might prove a crucial aid to the decision whether or not to accept the truth of them. Similarly, the South African courts have said that expert testimony can serve as a useful tool or guide against which the reliability of the testimony of eyewitnesses can be checked and tested.[15] It is for the judge to determine, on the balance of probability, on all the evidence they receive, where the probabilities lie. It may be that they are impelled to that conclusion when they are weighing two different types of evidence, one from extremely honest-appearing witnesses of fact and the other from an expert doing their best in their particular field of expertise.[16] Indeed in *Coopers Payen Ltd. v. Southampton Container Terminal Ltd.*[17] Clarke L.J. observed that the assumptions upon which the expert gives their opinion might prove to be incorrect by the time the judge has heard all the evidence of fact. In that event the opinion of the expert might no longer be relevant.

Thirdly, where there is conflicting expert opinion, a judge should test it against the background of all the other evidence in the case which they accept in order to decide which expert evidence is to be preferred.[18] In *Telles v. South West Strategic Health Authority*[19] the court preferred the evidence of an expert whose view was more consistent with the small amount of empirical evidence which the court had heard.

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[13] *Frost v. Oldfield* [2010] E.W.H.C. 279.
[14] [2005] E.W.C.A. Civ. 367.
[15] *Van der Westhuizen and Another v. SA Liberal Insurance Co. Ltd.* 1949 (3) S.A. 160 (C).
[16] *Armstrong and another v. First York* [2005] E.W.C.A. Civ. 277.
[17] [2003] E.W.C.A. Civ. 1223.
[18] *Chan Chung Keung v. Greenroll Ltd. t/a Conrad* [2005] H.K.C.U. 1812.
[19] *Telles v. South West Strategic Health Authority* [2008] E.W.H.C. 292.

Fourthly, a judge should consider all the evidence in the case, including that of the experts, before making any findings of fact, even provisional ones.[20] In *Mibanga v. Secretary of State for the Home Department*[21] the Court of Appeal observed that it was axiomatic that a fact-finder must not reach their conclusion before surveying all the evidence relevant thereto and that, just as one could not make a cake with only one ingredient, so also frequently one cannot make a case, in the sense of establishing its truth, otherwise than by the combination of a number of pieces of evidence.

II. THE QUALITY OF THE EXPERT'S REASONING

A second criteria for assessing an expert's evidence focuses on the quality of the expert's reasoning. A court should examine each expert's testimony in terms of its rationality and internal consistency in relation to all the evidence presented.[22] In *Routestone Ltd. v. Minories Finance Ltd. and Another*[23] Jacob J. observed that what really mattered in most cases was the reasons given for an expert's opinion, noting that a well-constructed expert report containing opinion evidence sets out both the opinion and the reasons for it. The judge pithily commented "[i]f the reasons stand up the opinion does, if not, not."[24] A court should not therefore allow an expert merely to present their conclusion without also presenting the analytical process by which they reached that conclusion.[25] In litigation which concerned whether an oil painting was by van Dyck, the consideration of the analytic process of attribution involved the judge viewing the questioned painting hanging alongside another of the same sitter in a different pose and hearing evidence from the parties' experts concerning vitality, brushwork,

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[20] *Jakto Transport Ltd. v. Derek Hall* [2005] E.W.C.A Civ. 1327.
[21] [2005] E.W.C.A. Civ. 367.
[22] *Wells v. Ortho Pharmaceutical Corporation* 788 F.2d 741 (11th Cir 1986).
[23] *Routestone Ltd. v. Minories Finance Ltd. and Another; Same v. Bird and others* [1997] B.C.C. 180.
[24] [1997] B.C.C. 180, 188.
[25] *Pacific Recreation Pte. Ltd. v. SY Technology Inc. and another appeal* [2008] S.G.C.A. 1. The expert in this case was an expert on foreign law.

spontaneity, mood, atmosphere and the differences between the two paintings.[26] In the clinical negligence field, the classic *Bolam* test,[27] that a doctor is not guilty of negligence if they have acted in accordance with a practice accepted as proper and responsible by a responsible body of medical practitioners skilled in that particular art, received a gloss in *Bolitho v. City and Hackney Health Authority*[28] when the House of Lords decided that, if professional opinion called in support of a defence case was not capable of withstanding logical analysis, then the court would be entitled to hold that the body of opinion was not reasonable or responsible.[29] Hence the court will weigh expert opinions in clinical negligence cases by examining the quality of the experts' reasoning.

Where there is a conflict between experts on a fundamental point, it is the court's task to justify its preference for one over the other by an analysis of the underlying material and of their reasoning. The Court of Appeal for England and Wales has observed that it is not sufficient, if there is no such material or reasoning, to accept the opinion of one expert rather than another simply on the grounds that they have given their evidence confidently.[30] In *Loveday v. Renton and another*,[31] on the issue of whether pertussis vaccine could cause permanent brain damage in young children, expert opinion was deeply divided. The court found that Dr. Robinson, in the care and precision of his answers,

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[26] *Drake v. Thos Agnew & Sons Ltd.* [2002] E.W.H.C. 294.

[27] *Bolam v. Friern Hospital Management Committee* [1957] 1 W.L.R. 582.

[28] [1998] A.C. 232.

[29] [1998] A.C. 232, at 241-243. Lord Browne-Wilkinson said: "The use of these adjectives – responsible, reasonable and respectable – all show that the court has to be satisfied that the exponents of the body of opinion relied upon can demonstrate that such opinion has a logical basis … These decisions demonstrate that in cases of diagnosis and treatment there are cases where, despite a body of professional opinion sanctioning the defendant's conduct, the defendant can properly be held liable for negligence (I am not here considering questions of disclosure of risk). In my judgment that is because, in some cases, it cannot be demonstrated to the judge's satisfaction that the body of opinion relied upon is reasonable or responsible. In the vast majority of cases the fact that distinguished experts in the field are of a particular opinion will demonstrate the reasonableness of that opinion".

[30] *St George v. Home Office* [2008] E.W.C.A. Civ. 1068.

[31] *Loveday v. Renton and another* [1990] 1 Med LR 117.

demonstrated exceptional clarity of thought and reasoning, but found it difficult to follow Dr. Wilson's reasoning. The court concluded it was more impressed by the cogency and quality of the reasoning of the experts called on behalf of the defendants.

A judge may find that an expert's opinion is based on illogical or even irrational reasoning and reject it.[32] A judge may give little weight to an expert's testimony where he finds the expert's reasoning speculative[33] or manifestly illogical.[34] Where a court finds that the evidence of an expert witness is so internally contradictory as to be unreliable, the court may reject that evidence and make its decision on the remainder of the evidence.[35] For example, after hearing valuation evidence in *Greenbank v. Pickles*[36] the court found abundant justification for the submission that an expert's evidence demonstrated a "confused, illogical and inconsistent" approach. The expert had confused freehold values and tenancy values, and the court could not accept his notion of how a hypothetical sale on the open market operated. Similarly, in *Wang Din Shin v. Nina Kung*[37] an expert's reasons for his opinion on the genuineness of disputed signatures were found not to stand up to logical analysis. Discrepancies were considered by the judge to be too blatant to be dismissed as "natural variations".

The court's task is made more difficult where experts do not include reasoning in their reports. In *Massey v. Tameside and Glossop Acute Services NHS Trust*[38] experts' reports on the assessment of the cost of past care and a prediction of the cost of future care contained differences of opinion. However the detailed reasoning of the expert witnesses in reaching their conclusions was not set out in their reports. Although their oral evidence went someway to remedying this defect, the absence of

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[32] *Drake v. Thos Agnew & Sons Ltd.* [2002] E.W.H.C. 294.
[33] *Gorelik v. Holder* 339 Fed. Appx. 70 (2nd Cir 2009).
[34] *Colville v. Verreries Pochet et du Caurval Societe Anonyme* (Court of Appeal (Civil Division), unreported, 27 October 1989).
[35] *Y and Another (Sri Lanka) v. Secretary of State for the Home Department* [2009] E.W.C.A. Civ. 362.
[36] *Greenbank v. Pickles* [2001] 1 E.G.L.R. 1.
[37] *Wang Din Shin v. Nina Kung* [2004] H.K.C.U. 730.
[38] *Massey v. Tameside and Glossop Acute Services NHS Trust* [2007] E.W.H.C. 317.

clear written explanations of how conclusions were reached had added to the difficulty of resolving the differences of opinion between the experts.

The expert's process of reasoning must therefore be clearly identified so as to enable a court to choose which of competing hypotheses is the more probable. However in *X and Y (by her tutor X) v. PAL*[39] Mohoney J.A. identified a difficulty with medical evidence saying that "... the expert's conclusion may not be able to be demonstrated by syllogistic reasoning but may depend, to a greater or lesser extent, upon 'feel' or 'judgment'". Of course, such an opinion is not necessarily invalid but it has obvious limitations, particularly when different experts, each using a similar approach, conflict with each other.[40]

III. THE CORRECTNESS OF FACTUAL PREMISES AND UNDERLYING ASSUMPTIONS

One of the *Ikarian Reefer*[41] principles in respect of the role of the expert witness emphasises the importance of factual material underlying an opinion.[42] It is a trite principle of evidence that the opinion of an expert, whatever the field of expertise, is worthless unless founded upon a sub-stratum of facts which are proved, exclusive of the evidence of the expert, to the satisfaction

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[39] (1991) 23 N.S.W.L.R. 26.

[40] *Tomislav Lipovac Bhnf Maria Lipovac v. Hamilton Holdings Pty. Ltd and others* [1996] A.C.T.S.C. 98.

[41] *National Justice Compania Naviera SA v. Prudential Life Assurance Co. Ltd. (No.1)* [1995] 1 Lloyd's Rep 455: "An expert witness should state the facts or assumptions upon which his opinion is based. He should not omit to consider material facts which could detract from his concluded opinion". The *Ikarian Reefer* principles were expanded upon in the *Protocol for the Instruction of Experts to give evidence in Civil Claims* (Civil Justice Council, June 2005).

[42] The 2005 *Protocol for the Instruction of Experts to give Evidence in Civil Claims* provided that "Experts should take into account all material facts before them at the time that they give their opinion. Their reports should set out those facts and any literature or any other material on which they have relied in forming their opinions. They should indicate if an opinion is provisional, or qualified, or where they consider that further information is required or if, for any other reason, they are not satisfied that an opinion can be expressed finally and without qualification".

of the court according to the appropriate standard of proof. Whether or not the expert believes in that sub-stratum of facts or knows them to be true or is satisfied that they are true, is completely beside the point. The expert's function is to express an opinion based on assumed facts, not to express a view on whether the assumptions are justified.[43] As Lawton L.J. said in *R v. Turner*[44] "[b]efore a court can assess the value of an opinion it must know the facts upon which it is based. If the expert has been misinformed about the facts or has taken irrelevant facts into consideration or has omitted to consider relevant ones, the opinion is likely to be valueless".[45] In *Bell v. F. S. & U. Industrial Benefit Society Ltd*,[46] McLelland J. said that the importance of proving the facts underlying an opinion was that the absence of such evidence deprives the court "of an important opportunity of testing the validity of process by which the opinion was formed, and substantially reduces the value and cogency of the opinion evidence". An expert report is therefore only as good as the assumptions on which it is based. Where the factual assumptions made by an expert witness are proved wrong, their opinion will be invalidated as a result[47] and, where an expert's conclusions are based on assumptions the reasonable accuracy of which cannot be confirmed by the evidence, then the court is likely to conclude that those conclusions are "unacceptably speculative".[48]

In *Haase v. Pedro*,[49] the British Columbia Court of Appeal said the premises on which experts had based their calculations of time, distance and speed regarding a road traffic accident "must be established by much more than vague and ill-defined testimony".[50] The evidence must be specific and accurate within

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[43] *Forrester v. Harris Farm Pty. Ltd. (in Liquidation), Tungsten Investments Pty. Ltd. (in Liquidation) and Galnorm (No.7) Pty. Ltd. (De-registered)* [1996] A.C.T.S.C. 1.
[44] [1975] Q.B. 834.
[45] [1975] Q.B. 834, at 840.
[46] (Supreme Court of New South Wales, unreported, 9 September 1987).
[47] *David v. General Medical Council* [2004] E.W.H.C. 2977.
[48] *Datasphere, Inc. v. Computer Horizons Corporation* (United States District Court for the District of New Jersey, unreported, 13 July 2009).
[49] (1970) 21 B.C.L.R. (2d) 273.
[50] (1970) 21 B.C.L.R. (2d) 273, at para. 11.

very narrow limits and not broad ones. In *Boulter v. Prior*[51] the judge heard an expert witness whose report was based on some measurements that he took himself and on the version of events as given to him by the plaintiff. The Court of Appeal observed that the problem with this type of witness was that his evidence inevitably depended upon his accepting in a reconstruction of the accident much, if not all, of what he was told by the plaintiff. Of course, if those factual assumptions proved to be inaccurate, then the whole calculation was thrown out. In *State of New Mexico v. Downey*[52] the defendant had been convicted in relation to a fatal road traffic accident. At trial, a prosecution expert testified that, based on the defendant's blood alcohol content test, taken six hours after the collision, the defendant had been under the influence of alcohol at the time of the collision. However the expert did not know when the defendant had consumed his last drink, which was critical to perform retrograde extrapolation calculations, and therefore his relation-back calculations were nothing more than mere conjecture.

In *Makita (Australia) Pty. Ltd. v. Sprowles*[53] the New South Wales Court of Appeal said that the basal principle was "that what an expert gives is an opinion based on facts".[54] Because of that, the expert must either prove by admissible means the facts on which the opinion is based, or state explicitly the assumptions as to fact on which the opinion is based. If other admissible evidence establishes that the matters assumed are "sufficiently like"[55] the matters established "to render the opinion of the expert of any value",[56] even though they may not correspond with complete precision, the opinion will be admissible and material. One of the reasons why the facts proved must correlate to some degree with those assumed is that the expert's conclusion must have some rational relationship with the facts proved.

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[51] *Boulter v. Prior* (Court of Appeal (Civil Division), unreported, 12 May 1994).
[52] *State of New Mexico v. Harry L. Downey* (2008) 145 N.M. 232.
[53] [2001] N.S.W.C.A. 305.
[54] [2001] N.S.W.C.A. 305, at para. 64.
[55] [2001] N.S.W.C.A. 305, at para. 64.
[56] [2001] N.S.W.C.A. 305, at para. 64.

Inevitably cases arise where factual material has been supplied to an expert by others. In *Gilbert et al. v. Graves et al. (Ruling re Expert Evidence),*[57] the court found that key assumptions on which the opinion was based were not stated, were of unexplained origin, or were not capable of being supported by any available evidence. In *Pownall v. Conlan Management Pty. Ltd.*[58] Anderson J. said that, in order to furnish an opinion about the profitability or net cash flow of a mining project, it was necessary to make assumptions about the cost of operations, including the mine operating costs, the cost of crushing and screening, the cost of transportation, and the cost of ship loading. Attempts had been made to lead evidence from an expert witness that would show that he had personally verified the data relied on for his estimates or had direct knowledge of the matters relied on. His evidence did not go that far. If anything it underlined the fact that he had relied on a range of material reported to him or provided by others. He treated the data he was given with appropriate circumspection, and accorded to it more or less reliability according to his own views about the quality of it and of its provenance. Whilst this constituted bringing his own judgment to bear on the task of valuation, Anderson J. did not think it overcame the fundamental difficulty. It said, in effect: "I have examined the costings and estimates made by others and on the strength of my own expertise and experience in the field I believe them to be reasonable". Such a forensic device overlooked the most important rule that it was for the court to judge the reliability of evidence given in support of the case. If an opinion relies on facts that must be proved or assumptions that must be verified, it is to the court that they must be proved and verified, not to the expert witness.

In matters involving specialised knowledge, the court has to rely on the opinion of experts, but it does not have to accept any opinion if it is not supported by the objective evidence. An expert opinion should have at the least a substratum of facts. In *Vadakathu v. George,*[59] a case concerning testamentary

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[57] *Gilbert et al. v. Graves et al. (Ruling re Expert Evidence)* 2006 B.C.S.C. 1844 (CanLII).
[58] (1995) 12 W.A.R. 370.
[59] *Vadakathu v. George* [2009] S.G.H.C. 79.

capacity, the Singapore High Court held that a medical opinion on schizophrenia, which was really based on a hypothetical case which the expert had constructed, could not be accepted. This was because the hypothesis itself had been based on the expert's version of the reconstructed facts which disregarded the actual evidence that contradicted the factual premises of his hypothetical case.

In an ideal world an expert will have had time to consider all possible options and to have made all proper and necessary enquiries. However matters do sometimes arise at the last moment, and sometimes evidence is given which shows that the basis upon which an expert has had to consider a matter is incorrect, and thus the expert has to approach the matter on a different basis. Although this means that evidence is being given to some extent on the hoof, a court is perfectly entitled to rely upon it.[60]

The need to have expert evidence based on a sound factual foundation may well have an impact on the way a judge manages a trial. In *Bayerische Ruckversicherung Aktiengesellschaft v. Clarkson Puckle Overseas Ltd. & another*[61] the judge took the view that this was the sort of case where the views of experts would be of the greatest value if given in the light of all the available factual material. He considered that it was only when the other witnesses had given their evidence that there was any real likelihood of the true factual issues between the parties emerging with any clarity. Thus for the plaintiffs' experts to give

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[60] *Ward v. Sherman Chemicals Ltd. and another* (Court of Appeal (Civil Division), unreported, 5 March 1997).

[61] *Bayerische Ruckversicherung Aktiengesellschaft v. Clarkson Puckle Overseas Ltd. and another; Alpina Versicherung Aktiengesellschaft and Another v. Bain Clarkson Ltd. and others* (Commercial Court), *The Times*, 23 January 1989. Where possible, of course, the facts in dispute should be agreed or narrowed. As Tomlin J. said in *Graigola Merthyr Co. Ltd. v. Swansea Corporation* [1928] 1 Ch. 31, at 38: "Long cases produce evils ... In every case of this kind there are generally many 'irreducible and stubborn facts' upon which agreement between experts should be possible and in my judgment the expert advisers of the parties, whether legal or scientific, are under a special duty to the court in the preparation of such a case to limit in every possible way the contentious matters of fact to be dealt with at the hearing. That is a duty which exists notwithstanding that it may not always be easy to discharge".

their final views before this happened carried with it at least a substantial risk that those views might be based on either incomplete or inaccurate factual assumptions, thereby devaluing the assistance which the experts could give to the court. He was of the view that there were strong reasons in favour of hearing the evidence of all the expert witnesses after the conclusion of all the factual evidence and accordingly so ordered.

IV. SCIENTIFIC VALIDITY

Courts recognise that there is "a continuum of reliability in matters of science from near certainty in physical sciences to the far end of the spectrum inhabited by junk science and opinion akin to sorcery or magic".[62] They therefore attempt to avoid "the perils of unreliable science".[63] They do this in two particular ways. Firstly, judges apply the test for admissibility of expert evidence in their jurisdiction so as to exclude manifestly unreliable science. Secondly, even where expert evidence has passed the admissibility hurdle, judges give less weight to science which appears of lesser reliability. Whether a technique can be demonstrably tested, the testing or validation employing control and error measurement, and some recognition or acceptance in the relevant scientific field all contribute to an assessment of the reliability of the opinion. Where expert evidence is given, it is the duty of the experts, "to furnish the Judge or jury with the necessary scientific criteria for testing the accuracy of their conclusions, so as to enable the Judge or jury to form his own independent judgment by the application of these criteria to the facts proved in evidence".[64]

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[62] *R. v. T.(J.E.)* [1994] O.J. No. 3067 (Q.L.) (Ont.Ct.Gen.Div.).

[63] *Re B (a child)* [2004] E.W.H.C. 411 (Fam).

[64] *Davie v. Edinburgh Magistrates* [1953] S.C. 34, at 38. *Davie's* case is not to be read as reflecting only a principle peculiar to Scottish law. Since the decision in *Davie* the approach has been followed in a range of other cases: *Lysaght v. Police* [1965] N.Z.L.R. 405; *Re B (A Minor) (Care: Expert Witnesses)* [1996] 1 F.L.R. 667; *O'Kelly Holdings Pty. Ltd. v. Dalrymple Holdings Pty. Ltd.* (1993) 45 F.C.R. 145; *Idoport Pty. Ltd. v. National Australia Bank Ltd.* [2001] N.S.W.S.C. 123; *R v. Gilfoyle* [2001] 2 Cr. App. R. 57; *Makita v. Sprowles* [2001] N.S.W.C.A. 305.

A pertinent consideration in assessing scientific validity is whether any theory or technique used by an expert in reaching their conclusion has been subjected to peer review and publication. Publication, which is but one element of peer review, does not necessarily correlate with reliability, and in some instances well grounded but innovative theories will not have been published. Some propositions, moreover, are too particular, too new, or of too limited interest to be published. But submission 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. The fact of publication, or lack thereof, in a peer-reviewed journal thus will be a relevant, though not dispositive, consideration in assessing the scientific validity of a particular technique or methodology on which an opinion is premised.[65] A court will therefore be more likely to give more weight to expert evidence which is well supported by literature, both locally and internationally.[66] The courts rely on the professionalism and rigor of the experts who come before them. That means not only drawing the court's attention to research that is contrary to their view, but that the experts are rigorous in the use they make of research papers.[67]

In *Re C*[68] two fathers had sought orders for immunisation of children. The judge concluded that the medical evidence relied on by the mothers to show that vaccination was dangerous and unnecessary was untenable. Dr. Donegan's report was based on no independent research, and most of the published papers cited by her in support of her views turned out either to support the contrary position or at least to give no support to her own. The Court of Appeal considered that the trial judges had been presented with junk science. In *Petursson and another v.*

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[65] *Daubert v. Merrell Dow Pharmaceuticals Inc.* (1993) 509 U.S. 579. Although this decision deals with the admissibility of expert evidence, these comments are equally applicable to the assessment of the weight of such evidence.

[66] *Chan Cheuk Chuen v. Pok Oi Hospital operating as Pok Oi Hospital Tang Pui King Memorial College* [2006] H.K.C.U. 967.

[67] *A Local Authority v. S* [2009] E.W.H.C. 2115 (Fam).

[68] *Re C (Welfare of Child: Immunisation)* [2003] E.W.C.A. Civ. 1148.

Hutchison 3G U.K. Ltd.,[69] the plaintiffs claimed that the defendant's mobile telephone mast had had substantial adverse effects on their physical well-being. Dr. Hyland for the plaintiffs failed to draw attention to a paper which was prepared by an international committee of scientists and which expressed strong criticism of Dr. Hyland's approach as being "not based on generally accepted scientific rules",[70] being "of dubious scientific nature",[71] and as not reflecting "the view of the majority of the accepted scientific experts in the field".[72] This indicated strong condemnation by peers as to Dr. Hyland's objectivity and scientific rigour, and was a factor in the court not being persuaded by his theory.

There may, of course, be valid reasons why experiments and research are not published. In *R v. Barron*[73] Professor Schroter was challenged that the results of his experiments had not been published in scientific literature, and that they had, therefore, not been subjected to peer review which would either give them credibility or expose any weaknesses. The professor responded that the reason he had so far refrained from publishing a paper on his findings was that, firstly, the work had not originally been directed to the preparation of a scientific paper; and, secondly, his colleague had unfortunately been extremely unwell, and it would have been impossible or impractical to produce a joint paper.

In a Hong Kong clinical negligence case concerning orthodontic treatment the evidence of the defendant's expert was founded upon scientific measurements and there was nothing in the circumstances that their theories could not explain. On the other hand, there was a so-called "anomaly" in the plaintiff's expert's theory and it could not explain why there was an increase

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[69] *Petursson and Another v. Hutchison 3G U.K. Ltd*. [2005] E.W.H.C. 920 (TCC).
[70] [2005] E.W.H.C. 920, at para. 74.
[71] [2005] E.W.H.C. 920, at para. 74.
[72] [2005] E.W.H.C. 920, at para. 74.
[73] *R v. Barron* [2009] E.W.C.A. Crim. 910.

of the mobility of the plaintiff's teeth whilst the degree of root resorption remained the same.[74]

In assessing the scientific validity of expert evidence, a court must be careful to distinguish between that and assessing the validity of the literature being offered by a party. In *Breeze v. Ahmed*[75] a plaintiff commenced proceedings against her deceased husband's general practitioner. It was her case that, had the defendant undertaken a proper examination of the deceased, he would have referred him to hospital immediately, investigations would have revealed his cardiac problems, and his death a month later from heart disease would have been prevented. The judge heard expert evidence for both parties, and preferred that of the defendant's expert. An appeal was allowed after the judge placed more weight on literature referred to by the defence expert than he should have done in the circumstances. The papers were highly technical and required careful reading and analysis, particularly so if they were to have the almost decisive effect upon the judge's mind as to which expert's evidence to prefer. The judge took on trust what the defendant's said were the important contents of the two papers, which, in turn, persuaded him to a very material extent to prefer his evidence to that of the plaintiff's expert.

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[74] *Lee Hau Chi Mariam Teresa v. Chung Chee Keung Peter and Others* [2007] H.K.C.U. 1773.

[75] *Breeze v. Ahmed* [2005] E.W.C.A. Civ. 223. The Court of Appeal emphasised the importance of the standard form of direction in clinical negligence cases that any unpublished literature upon which any expert witness proposed to rely should be served at the same time as service of their witness statement together with a list of published literature and copies of any unpublished material. Any supplementary literature upon which any expert witness proposes to rely should be notified to all other parties at least one month before trial.

As the Court of Appeal acknowledged in *R v. Cannings*[76] there are fields of science in which society is still "at the frontiers of knowledge".[77] Indeed, experts in many fields acknowledge the possibility that future research may undermine today's accepted wisdom. "Never say never" is a phrase which courts hear in many different contexts from expert witnesses. In *R v. Holdsworth*[78] the Court of Appeal for England and Wales noted that particular caution was needed where the scientific knowledge of the process or processes involved is or may be incomplete. As knowledge increases, today's orthodoxy may become tomorrow's outdated learning.

V. THE SOUNDNESS OF THE EXPERT'S METHODOLOGY

The scientific method requires the formation of a hypothesis, the testing of that hypothesis using a reliable methodology, the examination of the results and the formation of a conclusion.[79] In deciding what weight to accord expert evidence a trial judge must take into consideration whether the methodology which an expert has employed is flawed.[80] Where one expert's methodology is more sound, that expert's opinion may be accorded more weight.

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[76] *R v. Cannings* [2004] E.W.C.A. Crim. 1. The Court of Appeal concluded that where a full investigation into two or more sudden unexplained infant deaths in the same family is followed by a serious disagreement between reputable experts about the cause of death, and a body of such expert opinion concludes that natural causes, whether explained or unexplained, cannot be excluded as a reasonable, and not a fanciful, possibility, the prosecution of a parent or parents for murder should not be started, or continued, unless there is additional cogent evidence, extraneous to the expert evidence, which tends to support the conclusion that the infant, or where there is more than one death, one of the infants, was deliberately harmed. In cases like *Cannings* if the outcome of the trial depends exclusively or almost exclusively on a serious disagreement between distinguished and reputable experts, it will often be unwise, and therefore unsafe, to proceed.

[77] [2004] E.W.C.A. Crim. 1, at para. 178.

[78] [2008] E.W.C.A. Crim. 971.

[79] *R. v. McIntosh* [1997] CanLII 3862 (ON. C.A.).

[80] *McLean v. Seisel* [2004] CanLII 9418 (ON. C.A.).

In *Korpach v. Klassen*,[81] a case which concerned crop damage sustained as a result of cattle getting into a canola field, the plaintiff's expert measured off 28 separate plots throughout the field. In each plot, he physically counted all broken stems, pods on the ground, number of seeds in each pod, number of pods, and other visible damage. He provided a sketch showing the seven plot locations he finally determined as representative of the loss. He also did plant counts in at least four undamaged plots and a visual inspection by walking throughout the field. The court found his methodology to be meticulous and his evidence was accorded great weight. The defendant's expert looked at the field and proceeded a short distance into it. He did not do any plant counts. He took numerous photographs of the field from a position near the fence. His visual observations, which were essentially a "global" view without a "hands and knees" look at actual damage throughout the field, were accorded significantly less weight than the plot-by-plot count and the roaming of the field that the plaintiff's expert undertook.

In *Posthumous v. Foubert*[82] the court considered that an expert opinion was worthy of little weight where the expert had demonstrated "a surprisingly inadequate technique",[83] and that, with such a deficient methodology, it was difficult to assign much evidentiary reliability to his conclusions. In a controversial area of medicine he had made an initial diagnosis based on the contents of whatever medical records were sent to him, without the benefit of a history or a physical examination or any diagnostic tests to confirm the diagnosis. He also disregarded evidence which did not support his findings.

In *Leung Yuk Lin t/a King's Glory Educational Centre & Ors v. Karson Oten Fan*[84] the court found a handwriting expert's methodology "curious and out of line with prevailing practice". His examination of original signatures was extremely brief.

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[81] *Korpach v. Klassen* [2000] CanLII 19612 (SK P.C.).

[82] *Posthumous v. Foubert* [2009] M.B.Q.B. 206 (CanLII). The court concluded that the unspoken premise of his evidence was that the court should trust his opinion because he was an expert.

[83] [2009] M.B.Q.B. 206, at para. 61.

[84] *Leung Yuk Lin T/A King's Glory Educational Centre and Others v. Karson Oten Fan, Karno* [2009] H.K.C.U. 1027.

He did not use a magnifying glass and did not make any notes while examining the signatures, claiming to have a good memory. It was doubtful if he had carefully or properly examined the fluency, line qualities, pen pressure variations, pen pauses in the signatures, or ink deposits around the signatures with his naked eyes. As for the control signatures, he examined the images on the computer screen by enlarging and shrinking the images. He admitted he could not observe the change in pen pressure during such process. He only had a photocopy of the original questioned signature to compare with the images on the computer screen. His methodology was fatally flawed, and cast doubt on the reliability of his opinion. The judge considered his examination was superficial and his methodology unscientific, unconventional and out of date and gave no weight to his evidence.

However not every methodological error will necessarily lead to the rejection of an expert's conclusion. In *Simon Fraser University Administrative/Union Staff Pension Plan (Trustee of) v. Administrative and Professional Staff Association of the Simon Fraser University*,[85] which concerned the valuation of a pension fund, Tysoe J. noted a distinction between methodology and result. He held that it did not follow that a valuation should be considered mistaken simply because an actuary had used a methodology or an assumption which was not generally accepted in actuarial practice. There were too many variables in an actuarial valuation to conclude that an incorrect methodology or incorrect assumption would produce a mistaken valuation. Tysoe J. considered that if an actuary could produce a particular valuation utilising generally accepted actuarial methods and assumptions, the same valuation result by another actuary should not be considered mistaken because the second actuary used a method or assumption which were not generally accepted in actuarial practice. Thus, accepted methodologies and assumptions are used to define the range of reasonable outcomes, and as long as the result fell within this range, it was not mistaken. It did not therefore matter if an incorrect methodology or assumption was used in its calculation.

[85] [1997] B.C.J. No. 1671 (S.C.).

VI. THE QUALITY OF EXPERT'S INVESTIGATION

In other instances, while a methodology may not be flawed, the quality of the expert's investigation may be lacking and the trial judge should take this into consideration in deciding what weight to accord it.[86]

In *Great Billion Enterprises Ltd. v. Chan Lin Ying*[87] the issue was whether there were unauthorised structures or alterations on a property. The plaintiff called a surveyor who did not, at the time of his inspection, have access to a building plan of the property and so relied on an outdated floor plan. Although he said he had spent 45 minutes at the property, his evidence did not suggest that he had made a thorough inspection. Given his years of experience as a surveyor, it was surprising that he did not doubt the correctness of the floor plan, having regard to the differences between the actual physical layout and the layout depicted on the plan. His explanation was that, because his report was required urgently, he had rendered his opinions without calling for the building plans. The court held that the cavalier approach adopted brought into doubt his inherent reliability as an expert witness and it rejected his evidence insofar as it was inconsistent with other expert witnesses.

In *Berendsen v. Ontario*[88] the plaintiffs claimed that serious water quality problems on their farm were caused by contaminants from buried waste material. The court attached very little weight to the testimony of certain defence experts. Dr. Kirby had no first hand information about the conditions on the farm or of the cattle. He based his entire opinion on selected readings of scientific literature, only a few of which dealt with cattle. He did

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[86] *McLean v. Seisel* [2004] CanLII 9418 (ON. C.A.) A trial judge may give some greater weight to expert evidence which is better organised and presented. In a Hong Kong handwriting case Carlson J. said that, as between the two experts, he found one to be the far better organised and more professional. This emerged from the way that his reports had been set out (*Tsui Ning Jacky v. Wong Yat Sun and Others* [2006] H.K.C.F.I. 1396). There were, of course, other factors in the decision than just a matter of presentation. The preferred expert's reasoning was much more cogent and the rejected opinion amounted to really no more than speculation.

[87] *Great Billion Enterprises Ltd. v. Chan Lin Ying* [2003] H.K.C.U. 133.

[88] *Berendsen v. Ontario* [2008] CanLII 1416 (ON S.C.).

not read any of the reports prepared by the numerous experts involved, other than one. In giving his opinion, he relied solely on the selective information he had received from the defendant. In an effort to explain the obvious serious herd health problems, he suggested these were caused by stress factors such as poor husbandry, poor housing and adverse farm environment but he had made no effort to inquire about the actual presence or absence of those stress factors.

In *Doe v. Doe*,[89] where a plaintiff sued for damages following a sexual assault, Dr. Borins conducted no psychological testing, arrived at a diagnosis of post-traumatic stress disorder after only one consultation, and kept no notes of her session with the plaintiff. By contrast, Dr. Wolfe did extensive testing and kept detailed notes. The latter's opinion was preferred by the court. In *Generics (U.K.) Ltd. and others v. H Lundbeck A/S*[90] there were aspects of a report which an expert quickly abandoned during the course of his oral evidence. His explanation revealed "a certain lack of care in the preparation of his statement"[91] which the trial judge thought must therefore be approached with caution.

VII. THE EXPERT'S QUALIFICATION AND REPUTATION

It is legitimate, where there is a direct conflict of expert evidence, and the judge is unable to identify any more substantial reason for choosing between them, for the judge to prefer the evidence of one expert simply on the ground that that expert was better qualified to give it. This should not, however, often be the case.[92] Judges will, of course, bear in mind that "even the most distinguished expert can be wrong".[93]

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[89] *Doe v. Doe* [2004] CanLII 34340 (ON S.C.).
[90] *Generics (U.K.) Ltd. and Others v. H Lundbeck A/S* [2007] E.W.H.C. 1040 (Pat).
[91] *Generics (U.K.)* case (previous note), at para. 49.
[92] *English v. Emery Reimbold & Strick Ltd.; DJ & C Withers (Farms) Ltd. v. Ambic Equipment Ltd.; Verrechia (trading as Freightmaster Commercials) v. Commissioner of Police of the Metropolis* [2002] E.W.C.A. Civ. 605.
[93] *R v. Cannings* [2004] E.W.C.A. Crim. 1, at para. 17.

In *Bhamra v. Dubb*,[94] concerning a death from an allergic reaction, the judge heard evidence from Dr. Pumphrey, an eminent immunologist, who as part of his research had collated and studied all English fatal anaphylaxis episodes occurring since 1992. It was his evidence that, although a trace contamination can cause a severe reaction culminating in death, ingestion of small quantities of that kind generally had only mild consequences. He concluded that the victim had suffered a major reaction to a substantial dose of egg protein. If that was correct, one of the dishes served must have contained egg as an intentional ingredient. Dr. Franklin, the respondent's expert witness, emphasised that a trace contaminant could cause a fatal reaction and testified that, if the victim had eaten a substantial quantity of egg, he would have expected him to experience symptoms within a very short time. The judge was entitled to prefer the views of Dr. Pumphrey to those of Dr. Franklin, supported as they were not only by his extensive knowledge and experience of anaphylaxis but by the studies he had undertaken into deaths caused by it.

In *Drake v. Thos Agnew & Sons Ltd.*,[95] a case which concerned whether a painting was a genuine van Dyke, the outcome turned on the subjective assessment or "eye" of the two experts. The court heard evidence from Sir Oliver Millar whose experience, knowledge and general expertise concerning van Dyck's English Period was unrivalled. Buckley J. said that, in reaching his conclusion, he had been significantly influenced by the acknowledged greater expertise that Sir Oliver possessed in relation to these works.

However a judge should not be overly influenced by reputation and qualifications. In the Canadian case of *R v. Murrin*[96] Henderson J. warned that the fact "that the experts usually have impressive academic credentials and extensive experience may serve to lend an air of 'mystic infallibility' to the evidence". In *Telles v. South West Strategic Health Authority*[97] Saunders J. considered the evidence of a cardio-thoracic surgeon

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[94] *Bhamra v. Dubb (t/a Lucky Caterers)* [2010] E.W.C.A. Civ. 13.
[95] *Drake v. Thos Agnew & Sons Ltd.* [2002] E.W.H.C. 294 (QB).
[96] (1999) 181 DLR (4th) 320, 333.
[97] *Telles v. South West Strategic Health Authority* [2008] E.W.H.C. 292 (QB).

whose expertise in the field was close to being unrivalled. The judge observed that clearly the surgeon's opinions must command a great deal of respect although his distinguished career did not mean that his opinions must always be right. Similarly, in *Vadakathu v. George*[98] Chan Sek Keong C.J. noted that the court must not be too deferential to the expert's expertise and fail to apply its mind sufficiently to the evidence. This trap is therefore to be avoided.

VIII. THE OBJECTIVITY OF THE EXPERT

Courts expect expert witnesses to give evidence from an objective standpoint. Their evidence will be accorded less weight if they are perceived as lacking objectivity. One measure of the value of an expert's opinion is whether an objective and disinterested methodology was employed. Objectivity can also be measured by the expert's inclusion and discussion of counter-arguments and contrary sources of information. It can be further measured by exploration of potential biases the expert may hold.[99]

The most obvious sign of a lack of objectivity is siding with the instructing party. In *O'Scolai v. Antrajenda*[100] a physiotherapist appeared more concerned with defending the genuineness of her patient's symptoms than simply testifying objectively about her own observations and findings. She even went to the extent of denying the accuracy or completeness of her own notes and objective test results where they contradicted what was now being reported by the plaintiff.

A second sign of a lack of objectivity can be over-attachment to a theory. An expert's association with a particular side of an argument creates an inherent bias that is difficult to overcome. The process of extracting conclusions from particular facts may begin to look less like the objective analysis of a

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[98] *Vadakathu v. George* [2009] S.G.H.C. 79.

[99] *Saginaw Chippewa Indian Tribe of Michigan and United States of America v. Granholm, Cox, and Rising, and City of Mt. Pleasant and County of Isabella* (United States District Court for the Eastern District of Michigan, Northern Division, unreported, 4 February 2010).

[100] *O'Scolai v. Antrajenda* [2008] A.B.Q.B. 257 (CanLII).

scholar and more like the persuasive argument of an advocate.[101] Courts are cognisant of the fact that there is a category of experts who have developed "a scientific prejudice" and who, as a consequence, permit their convictions to lead their analysis.[102] It is perfectly proper therefore for a judge to be suspicious of a partisan and rigid expert.[103] Of course, while there may be instances where excessive enthusiasm takes the edge off the high degree of objectivity expected of expert witnesses,[104] a witness may nevertheless express their views forcefully and passionately and not found to be lacking in objectivity.[105] In *Taylor v. Liong*[106] the trial judge concluded that the primary witness for the plaintiff testified as an advocate for a theory that once had currency but had since been eroded by the advance of scientific studies and knowledge. He found in the witness's evidence a tendency to overstate the implications of studies that he relied on, and to be unduly dismissive of those that undermined his theory. Hence the court found that a commitment to his own theory of causation had, to some extent, impaired his objectivity and reliability as an expert witness.

A third sign of lack of objectivity can be defensiveness. In *Berendsen v. Ontario*[107] Dr. Wilson admitted a significant proportion of the mice on the Berendsen water, as opposed to the control group, developed tumours and kidney, liver and spleen abnormalities. Without any investigation of the cause of these tumours, Dr. Wilson was unusually defensive in his evidence about this water trial, and as a result, his evidence was considered to lack scientific objectivity. In *Qualcomm Incorporated v. Nokia*

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[101] *Saginaw Chippewa Indian Tribe of Michigan* (above, note 95).
[102] *A Local Authority v. S* [2009] E.W.H.C. 2115 (Fam).
[103] Justice Terry Connolly, "Art, Science or 'A Broad Axe and A Sound Imagination': Assessment of Personal Injury Claims in the Supreme Court of the Australian Capital Territory", paper presented to the National Injury Management and Prevention Summit, Canberra, 27 March 2004.
[104] *Baxter Healthcare Corporation and Others v. Abbott Laboratories and Another* [2007] E.W.H.C. 348 (Pat).
[105] *Designers Guild Ltd. v. Russell Williams (Textiles) Ltd. (t/a Washington DC)* (Chancery Division, unreported, 14 January 1998).
[106] *Taylor v. Liong* [2008] B.C.S.C. 242 (CanLII).
[107] *Berendsen v. Ontario* [2008] CanLII 1416 (ON. S.C.).

Corporation[108] Professor Steele adopted a somewhat combative and argumentative approach to his evidence. To a degree, this was an aspect of his character which came through clearly during his time in the witness box. But it did seem that he was on occasion losing the objectivity which his position as an expert required. In a number of instances the judge considered he was rather more interested in jousting with counsel, and scoring what he thought were points for his side, than in answering the technical questions put to him. In *SOC v. Minister for Education and Science*[109] the court noted a witness's readiness to answer a question without any apparent reluctance or difficulty being in stark contrast to the manner in which he responded to similar questions put to him during cross-examination some days later when it seemed he went to extraordinary lengths to avoid answering the very question which he had previously answered without difficulty. The court found this part of his evidence indicative of a certain lack of objectivity in his capacity as an expert witness.

Of course, certain types of expert evidence are dependant on high levels of subjective opinion, for example, evidence in the field of handwriting.[110] In *Nina Kung v. Wong Din Shin*[111] Chan P.J. observed that, whilst the factual part of the evidence of an expert was verifiable and was as reliable or unreliable as any other piece of factual evidence, the opinion part of an expert's evidence was totally different. Handwriting analysis was not an exact science and the opinion of a handwriting expert, however objective it was, was inherently less precise than a conclusion based on the results of a scientific analysis. Similarly, in *Quorum AS v. Schramm*[112] which concerned a dispute as to the amount payable under an insurance policy after a fire at a warehouse

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[108] [2008] E.W.H.C. 329 (Pat).

[109] *SOC (a minor suing by his father and next friend) v. Minister for Education and Science and others* [2007] I.E.H.C. 170.

[110] *Chinachem Charitable Foundation Ltd. v. Chan Chun Chuen and others* [2010] H.K.C.U. 273.

[111] (2005) 8 H.K.C.F.A.R. 387.

[112] *Quorum AS v. Schramm* [2002] Lloyd's Rep. IR 292. As an example of the highly subjective judgments involved one of the experts gave evidence: "It is an interesting work, but the girls are ugly … I would not expect this work which is interesting, but not pretty, to achieve its best price at auction".

damaged a work of art by Degas, the court approached the expert valuation evidence with a degree of caution given the highly subjective judgements involved. The court considered one expert's valuation of $5-6 million as too high because the witness over-emphasised the unusual nature of the subject and was over-influenced by its subjective appeal to him.

IX. BIAS BY AN EXPERT

Unless a jurisdiction has in place a system that arranges for single joint experts, the practicalities of litigation under the adversarial system means that all evidence is selective, and it is selected on the basis of what will help a party to win, not on the basis of whether it will help the court to find the facts correctly. Indeed, the reliability of expert evidence is antipathetical to the interests of the litigant except where reliability and interest coincide by accident.[113] In *JSI Shipping (S) Pte. Ltd. v. Teofoongwonglcloong (a firm)*,[114] the Singapore Court of Appeal recognised that a certain degree of partisan advocacy may be an inevitable consequence of adducing expert evidence in the gladiatorial context of an adversarial system, but emphatically reiterated that it would not hesitate in an appropriate case to disregard, or even draw an adverse inference against, expert evidence that exceeded the judicially determined boundaries of coherence, rationality and impartiality. The court observed that, when that happened, the primary casualty would be the expert's

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[113] Justice H.D. Sperling, "Expert Evidence: The Problem of Bias and Other Things", speech at the Supreme Court of New South Wales Annual Conference, Terrigal, 3-4 September 1999.

[114] [2007] S.G.C.A. 40. The respondent's expert made "sweeping generalisations redolent of a predisposition to shore up the respondent's stance", leapt to baseless conclusions adverse to the other party, and left out crucial portions of a quotation which cast an entirely different light on the materials which he reproduced. The evidence of the appellant's expert was similarly tainted. In *General Electric Capital Canada Inc. v. The Queen* [2009] T.C.C. 563 (CanLII) Hogan J. expressed the view that bias was "not necessarily the expert's fault but is a product of the pressure imposed by the system". Hogan J. considered it was "the duty of a trial judge to be sure that the expert appearing before him has not advertently or inadvertently put on a counsel's robe in pressing his opinion upon the court".

professional reputation. The *Ikarian Reefer*[115] principles require expert evidence presented to a court to be the independent product of the expert uninfluenced as to form or content by the exigencies of litigation. Further, an expert witness should provide independent assistance to a court by way of objective, unbiased opinion and should never assume the role of an advocate. In some cases, however, expert witnesses fall woefully short of this standard[116] and, inevitably, an expert's credibility and impact will be diminished, or eliminated altogether, by a partisan and biased approach.[117]

Expert bias may be unconscious rather than deliberate. There are several reasons for this.[118] Firstly, the inevitability that the parties, on either side, will select experts who are recognised as likely to provide an opinion which favours their case, leaving unexplored a range of opinions on the continuum which may be more representative of the relevant speciality. Secondly, the involvement of the expert as part of the team for a party, in the course of which they may assist in the formulation of the case, and search for holes in the opinion of any expert qualified by the opponent. Thirdly, the practice effect derived from regular appearances in the courts, as a result of which the witness may learn to adjust their testimony to accommodate potential problems, and may also learn how to present an aura of confidence and persuasiveness, in a way which will be dismissive of any challenge. Fourthly, the drift of retired practitioners lacking current research and clinical experience, but with impressive credentials, into practice as an expert witness; accompanied by a reluctance of some of the most able practitioners to enter the field because of the disruption which it has for their work, and their dissatisfaction with what may seem to be the artificial restraints of the adversarial system. Fifthly, the

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[115] *National Justice Cia Naviera SA v. Prudential Assurance Co Ltd.* [1993] 2 Lloyd's Rep. 68.

[116] *CXY Chemicals Canada Ltd. Partnership v. Kvaerner Chemetics Inc.* [1998] CanLII 6660 (BC S.C.).

[117] *William et al v. British Columbia et al* [2005] B.C.S.C. 131 (CanLII).

[118] Justice Wood, "Forensic Sciences from the Judicial Perspective", speech at the 16th International Symposium on Forensic Sciences, Canberra, 13-17 May 2002.

emergence of an economic tie between the witness and the engaging party.[119]

The law reports are sadly replete with instances of experts having been found biased. In *Pearce v. Ove Arup Partnership Ltd. and Others (No.2),*[120] the judge concluded that the expert "came to argue a case" and that "any point which might support that case, however flimsy, he took". In *Marsden v. Amalgamated Television Services Pty. Ltd.*[121] a psychiatrist admitted under cross-examination in a defamation trial that he had removed significant material from his report at the request of a solicitor for the party that had engaged him. The matter only came to light when an earlier version of his report was accidentally passed to cross-examining counsel. In *Twinlock p.l.c. and another v. Ajax Insurance Association Ltd.; Ajax Insurance Association Ltd. v. Holman,*[122] with the exception of one witness, who appeared to be genuinely interested as to what the correct answer was to a scientific problem, the other experts were found to be merely concerned to advance the theories which were the most favourable to the clients whom they were representing.

Whether bias is conscious or unconscious, the important issue is its potential impact. In *Baulderstone Hornibrook Engineering v. Gordian Runoff (formerly GIO Insurance)*[123] the court found that an expert had spent so much time, and been so involved over so many years in providing advice in relation to the plaintiff's litigation problems, that his objectivity had suffered. Whether this was subliminal was not the point.

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[119] In *Frazer v. Haukioja* [2008] CanLII 42207 (ON S.C.) the court observed that an expert being paid for services rendered in a case was not, of itself, a concern but the profile elicited from Dr. Reznek, that about 80% of his medical legal work was done for defendants and that that involved "more like 25%" of his professional time being devoted to medical legal matters from which he earned "probably twice as much income" as he did from his clinical practice, was a red flag, the sight of which focused the court's attention upon the need for impartiality to be demonstrated in the evidence the expert proposed to give.

[120] *Pearce v. Ove Arup Partnership Ltd. and others (No.2)* (Chancery Division, unreported, 2 November 2001).

[121] [2001] N.S.W.S.C. 510.

[122] *Twinlock p.l.c. and another v. Ajax Insurance Association Ltd.; Ajax Insurance Association Ltd. v. Holman* (Queen's Bench Division, unreported, 17 October 1997).

[123] [2006] N.S.W.S.C. 223.

The difficulty for the court was to assess when his opinion was entirely uninfluenced by his partiality and when it was, or may very well have been, affected by that partiality.

What criteria have judges used to assess whether experts have demonstrated bias? In *Re Qantas Airways Ltd*[124] Goldberg J. gave guidance as to those indicators judges might use to know when an expert was becoming an advocate, observing that generally, whether an expert's opinion is confined to his or her area of expertise and whether experts state the factual basis upon which they have formed their opinion, are useful considerations in determining at what point an expert witness ceases to be impartial and has moved beyond the bounds of legitimacy into advocating for a party. He also suggested that another indicator is the willingness of an expert to respond to questions whose answers may provide support for a view which is contrary to the interests of the party calling them. In *Frazer v. Haukioja*[125] Moore J. observed that cherry-picking facts which supported a diagnosis that just happened to support the cause of the client who retained the expert and failing to include the facts that hurt the cause, whether those latter facts were capable of explanation and elimination in the course of the development of the expert's analysis and opinion or not, smacked of partiality. In *United City Properties Ltd. v. Tong*[126] the Supreme Court of

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[124] [2004] ACompT 9.

[125] *Frazer v. Haukioja* [2008] CanLII 42207 (ON S.C.).

[126] [2010] B.C.S.C. 111 (CanLII) These factors were: (1) The nature of the stated expertise or special knowledge; (2) Statements publicly or in publications regarding the prosecution itself or evidencing philosophical hostility toward particular subjects; (3) A history of retainer exclusively or nearly so by the prosecution or the defence; (4) Long association with one lawyer or party; (5) Personal involvement or association with a party; (6) Whether a significant percentage of the expert's income is derived from court appearances; (7) The size of the fee for work performed or a fee contingent on the result in the case; (8) Lack of a report, a grossly incomplete report, modification or withdrawal of a report without reasonable explanation, a report replete with advocacy and argument; (9) Performance in other cases indicating lack of objectivity and impartiality; (10) A history of successful attacks on the witness's evidence; (11) Unexplained differing opinions on near identical subject matter in various court appearances or reports; (12) Departure from, as opposed to adherence to, any governing ethical guidelines, codes or protocols respecting the expert witness's field of expertise; (13) Inaccessibility

British Columbia set out a list of fourteen factors which might warrant consideration when ascertaining bias and impartiality.

Judges must take great care in expressing views about possible expert witness bias. In *Vakauta v. Kelly*[127] the High Court of Australia recognised that it was inevitable that a judge who sits regularly to hear personal injury actions will form views about the impartiality of some medical experts who are frequent witnesses in his court. For example, a judge may carry with him the knowledge that some medical witnesses, who are regularly called to give evidence on behalf of particular classes of plaintiffs (for example members of a particular trade union), are likely to be less sceptical of a plaintiff's claims and less optimistic in their prognosis of the extent of future recovery than are other medical witnesses who are regularly called to give evidence on behalf of particular classes of defendants (for example those whose liability is covered by a particular insurer). In *Vakauta* the judge expressed such a view "in forceful and colourful terms",[128] saying that a usual panel of doctors for the defendant's insurers "think you can do a full week's work without any arms or legs"[129] and suggesting that the three doctors involved in the case expressed opinions which were "almost inevitably slanted … consciously or unconsciously"[130] in favour of the defendants. His decision was set aside on appeal.

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prior to trial to the opposing party, follow through on instructions designed to achieve a desired result, shoddy experimental work, persistent failure to recognise other explanations or a range of opinion, lack of disclosure respecting the basis for the opinion or procedures undertaken, operating beyond the field of stated expertise, unstated assumptions, work or searches not performed reasonably related to the issue at hand, unsubstantiated opinions, improperly unqualified statements, unclear or no demarcation between fact and opinion, unauthorised breach of the spirit of a witness exclusion order; and (14) Expressed conclusions or opinions which do not remotely relate to the available factual foundation or prevailing special knowledge.

[127] *Vakauta v. Kelly* [1989] H.C.A. 44.

[128] [1989] H.C.A. 44, at para. 2 (Dawson J.).

[129] [1989] H.C.A. 44, at para. 2 (Dawson J.).

[130] [1989] H.C.A. 44, at para. 2 (Dawson J.).

X. THE DEMEANOUR OF THE EXPERT

Although the demeanour of expert witnesses is not as important as that of other witnesses, it is nonetheless still material for the purpose of assessing the value of their evidence.[131] In *Wiki v. Atlantis Relocations (NSW) Pty. Ltd.*[132] the New South Wales Court of Appeal observed that, where an issue in dispute involves differences between expert witnesses which are capable of being resolved by examination and rational analysis, and where the experts are properly qualified and none has been found to be dishonest, misleading, unduly partisan or otherwise unreliable, a decision based solely on demeanour will not provide the losing party with a satisfactory explanation for their lack of success. However the court noted that, in some disputes between experts, demeanour will be crucial. This may occur where a witness has given dishonest or misleading evidence, or has become an advocate for a party, or where the evidence given is inherently unreliable for other reasons. Demeanour may also be crucial in other cases where the evidence is not so tainted. Situations may arise where, after due consideration of the reasoning of the expert witnesses, the judge is simply unable to decide the issue otherwise than by impression and demeanour. Demeanour also often plays a partial role in a decision whether to prefer one expert over another: a judge may be persuaded by a combination of the material force of an expert's views together with the way in which the evidence was given.

In *Public Trustee v. The Commonwealth*[133] Mahoney J.A. observed that, not infrequently, the court may not be in a position to decide whether the facts on which the witness relies are true, and may not be able to judge the scientific or professional accuracy of the principles. Where experts state different conclusions and rely for them upon facts which differ and principles which do not agree, the court may not be able to form

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[131] *Joyce v. Yeomans* [1981] 2 All E.R. 21. This should not prove surprising. Redmayne, *Expert Evidence and Criminal Justice* (Oxford University Press, 2001), p. 110 summarises research which suggests that as expert evidence becomes more complicated, jurors shift their focus and rely on peripheral *indicia* of reliability such as the expert's qualifications or demeanour.

[132] [2004] N.S.W.C.A. 174.

[133] (New South Wales Court of Appeal, unreported, 20 December 1995).

its conclusion by reference to those facts or those conclusions alone. When a judgment must be made between the facts and the principles advocated at the trial, the court may not be in a position to give objectively convincing reasons for its choice. It may therefore, in the end, have to depend upon the impression which the witness has made.

In *Wells v. Ortho Pharmaceutical Corporation*[134] there was a conflict in the evidence of the expert witnesses. The court stated that it had found scientific studies to be inconclusive on the ultimate issue of whether a spermicidal jelly had caused the plaintiff's birth defects. In facing this "battle of the experts"[135] the court was forced to make credibility determinations to "decide the victor".[136] In assessing credibility, as well as considering each expert's training and experience and examining each expert's testimony in terms of its rationality and internal consistency, the court also looked at each expert's demeanour and tone and searched for motives, biases, and interests which might have influenced their opinions.

Nevertheless there is judicial reluctance to overvalue the importance of demeanour. In *Djedovic v. Gonzales*[137] Judge Easterbrook emphasised that the effect of an expert's evidence depended more on the quality of its reasoning and the scope of its data, and less on the expert's bearing. He observed that good scholarly analysis did not become bad simply because a professor stuttered or fidgeted. That was why observable factors like demeanour and tone of voice were less important when it came to expert witnesses, whose reliability was supposed to be based on their expertise rather than on what they claimed to have witnessed. He stated that judges often overestimated their ability to sift true from false testimony by assessing demeanour, which he described as "a form of lie detector without the electrodes and graph paper"[138] and suggested that the comprehensiveness and logical consistency of testimony was far more valuable and could

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[134] *Wells v. Ortho Pharmaceutical Corporation* 788 F.2d 741 (11th Cir 1986).
[135] *Wells* (note 134, above) at para. 8.
[136] *Wells* (note 134, above) at para. 8.
[137] *Djedovic v. Gonzales* 441 F.3d 547 (7th Cir 2006).
[138] *Djedovic* (note 137, above) at para. 10.

be evaluated on paper as well as, if not better than, through oral presentations.

XI. THE EXPERT'S PERFORMANCE UNDER CROSS EXAMINATION

The trial process involves an intensive testing of expert evidence through cross-examination. Questions are put by the opposing party's counsel who will have been educated deeply in the issues by his own party's expert. The reasons underlying an expert's opinion are apt to be probed without remorse before a court which itself will have developed a good understanding of the technical subject-matter.[139] Cross-examination will therefore explore any biases or unreliabilities which might affect an expert's objectivity.[140] An expert will be asked any question the answer to which might tend to qualify, explain, or render improbable the opinion expressed on direct examination.[141]

As Ormrod L.J. observed in *R v. Bracewell*[142] it is

> part of cross-examining counsel's duty to invite expert witnesses to consider alternative hypotheses and, after examining them in detail, to conclude by asking "Can you exclude the possibility?" The available data may be inadequate to prove scientifically that the alternative hypothesis is false, so the scientific witness will answer "No I cannot exclude it" though the effect of his evidence as a whole can be expressed in terms such as "But for all practical purposes it is so unlikely that it can safely be ignored".[143]

An expert witness may therefore in the course of cross-examination have to make concessions which cause a judge to conclude that some caution needs to be exercised in relation to

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[139] *Eli Lilly & Co. v Human Genome Sciences Inc* [2010] E.W.C.A. Civ. 33.
[140] *Messier v. Southbury Training School* (United States District Court for the District of Connecticut, unreported, 29 June 1998).
[141] *State v. Pearson and others* (1961) 260 Minn. 477.
[142] *R v. Bracewell* (1979) 68 Cr. App. Rep. 44.
[143] *R v. Bracewell* (note 142, above) at 49.

their evidence.[144] After hearing an expert witness give evidence, they may conclude that an expert witness was comprehensively destroyed in cross-examination.[145] On the other hand a judge may conclude that the expert was not shaken in their views and hence place heavy reliance on that evidence.[146]

In exceptional cases the honesty of an expert witness may be challenged. In *Coetzee v. Mississauga Hospital*[147] MacKenzie J. observed that the judge should not be left with any concerns or reservations about the honesty of an expert before addressing the reliability of their opinion evidence. Reasonable and honest experts may reasonably differ. Dishonesty by an expert witness in representing to the court their impartiality and even-handedness causes that expert to stumble at the first hurdle and essentially be out of the race. The weighing of the conflicting opinions of the experts on both sides of an issue is rendered difficult in the extreme when, at the very outset, the judge has incontrovertible evidence of lack of probity on the part of one of those experts. In *Coetzee* the judge found that Dr. Crosby had given false testimony and had attempted to mislead the court by falsely stating that he had previously given expert evidence on behalf of defendant doctors as well as plaintiffs in medical malpractice cases. For this and other reasons the court rejected his evidence whenever it was in conflict with the evidence not only of the two defence expert witnesses but of the plaintiffs' other expert witness.

Cross-examination does, however, have its limitations. Muldoon J., sitting in the Federal Court of Canada, expressed this starkly in *Unilever p.l.c. v. Procter & Gamble Inc.*[148]: "Cross examination is said to be the great engine for getting at the truth, but when the unschooled judge cannot perceive the truth, if he or she ever hears it, among all the chemical or other scientific baffle gab, is it not a solemn exercise in silliness?"

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[144] *Club Travel 2000 Holdings Ltd. v. Murfin* [2008] All E.R. (D) 56.
[145] *Masood and others v. Zahoor and others* [2008] E.W.H.C. 1034.
[146] *McDermott v. Wallace* [2005] 3 N.Z.L.R. 661.
[147] *Coetzee v. Mississauga Hospital* [2005] CanLII 21679 (ON. S.C.).
[148] *Unilever p.l.c. v. Procter & Gamble Inc.* (1993) C.P.R. (3rd) 479.

XII. CHANGES OF OPINION BY THE EXPERT

The *Ikarian Reefer* principles[149] envisage that experts may change their opinion after consideration of another point of view. Experts who change their opinions for good reason on the receipt of fresh information are respected rather than criticised by the court, provided, of course, their reasons for doing so are sound.[150] There is nothing intrinsically wrong with an expert changing their view on further reflection or on the basis of fresh information.[151] An expert may honestly change their opinion either as a result of further research and thought or as a result of discussions with other experts. Whether such a change of view shows an admirable flexibility of thought, or a regrettable inconstancy of mind, is a matter for the judge to assess.[152] It can therefore be a sign of strength or weakness and the judge must consider whether an expert genuinely holds the opinion they are now expressing or is vainly clutching at straws to bolster a case.[153] The fact that an expert changes their opinion is not necessarily a ground for suggesting that their revised opinion is or may have been unfounded or not based upon sound reasoning.[154] In *Oakes v. Neininger*[155] criticism was made of a doctor that he had changed his views in one or two instances. The trial judge concluded that that seemed in his case to be more of a merit as experts who were prepared to change and moderate their views particularly after discussions with the other experts were behaving properly. Whilst experts can, and sometimes must, change their views, a trial judge may have reservations about some shifts in a witness's approach

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[149] *National Justice Cia Naviera SA v. Prudential Assurance Co. Ltd.* [1993] 2 Lloyd's Rep 68. If, after exchange of reports, an expert witness changes their 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.

[150] Lord Justice Wall, "The Use Of Experts In Family Cases", speech to the Annual Bond Solon Expert Witness Conference, London, 6 November 2009.

[151] *Telles v. South West Strategic Health Authority* [2008] E.W.H.C. 292.

[152] *Robin Ellis Ltd. v. Malwright Ltd.* [1999] Adj.L.R. 02/01.

[153] *Transco p.l.c. v. Griggs* [2003] E.W.C.A. Civ. 564.

[154] *Stallwood v. David and another* [2006] E.W.H.C. 2600.

[155] *Oakes v. Neininger and others* [2008] E.W.H.C. 548.

to a case.[156] In some cases a witness's evidence many contain too many changes of view, insufficiently reasoned, to permit a judge to place much reliance on it.[157]

In *Baulderstone Hornibrook Engineering v. Gordian Runoff (formerly GIO Insurance)*[158] the court observed that an expert's many changes in stance suggested a high lack of confidence in his own opinions. It was quite clear that his opinions had changed over time, and indeed continued to change in the witness box, the changes being often quite radical. These were not matters which gave the court confidence in his opinions. The frequent changes in direction were problematic. In *Baldwin v. Dodds* one aspect of an expert's testimony was found to be "a late and wholly unconvincing attempt to bolster his overall argument".[159] Likewise, in *BSkyB Ltd. and another v. HP Enterprise Services U.K. Ltd. (formerly Electronic Data Systems Ltd.) and others*[160] an expert witness made new and important changes in his oral evidence as compared to the evidence which he had set out in his report. Whilst the court accepted that he was not accustomed to testifying in court, these aspects detracted from the weight that could be given to his evidence.

Sometimes an expert witness may refuse to make what a more wise witness would make, namely, proper concessions to the viewpoint of the other side.[161] In *Novartis Grimbsy Ltd. v. Cookson*[162] the judge was not impressed by Professor Cartwright's unwillingness to reconsider his opinion on causation in the light of the new information brought to his attention.

XIII. STRAYING OUTSIDE A FIELD OF EXPERTISE

Where the testimony of an expert witness strays outside the realm of their expertise the court is unlikely to place much weight

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[156] *Tomlinson v. Wilson* [2007] All E.R. (D) 17.
[157] *Great North Eastern Railway Ltd. v. Railcare Ltd.* [2003] E.W.H.C. 1608.
[158] [2006] N.S.W.S.C. 223.
[159] *Baldwin v. Dodds* [2009] E.W.H.C. 3505, at para. 15.
[160] *BSkyB Ltd. and Another v. HP Enterprise Services U.K. Ltd. (formerly Electronic Data Systems Ltd.) and Others* [2010] E.W.H.C. 86 (TCC).
[161] *Joyce v. Yeomans* [1981] 2 All E.R. 21.
[162] [2007] E.W.C.A. Civ. 1261.

on that portion of their opinion. In *Casley-Smith v. FS Evans & Sons Pty. Ltd. (No.1)*[163] Olsson J. observed that opinion evidence must be strictly confined to matters which are truly the subject of the special knowledge, study, or experience of the proposed expert. A witness may not be permitted to range outside their proper sphere of expertise merely under the rubric of some wide, generic type, description or title of qualifications said to be held. That is, of course, not to deny that the vital issue is always the span of a person's training and experience enabling that person to make a responsible judgment; and not necessarily the relative depth of specialist knowledge within a particular discipline area – leaving to one side abstruse areas so highly specialised that a mere basic formal qualification or experience would necessarily and patently be quite inadequate to found any helpful, responsible, opinion.

Merely because a person is an expert and can assist the court to understand discrete issues raised by the parties does not mean they must opine about *every* important issue in the case. On the other hand, despite the parties' arguments otherwise, simply because a witness is not an expert about *everything* does not mean they are unqualified to offer expert opinion about *anything.*[164]

In *Bogle and others v. McDonald's Restaurants Ltd.*[165] the plaintiffs sued for personal injuries caused by the spillage of hot drinks. The plaintiffs called an expert witness, Donald Ives, who was a mechanical engineer with experience in the food and allied

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[163] (1988) 49 S.A.S.R. 314. Or, as Gillen J. said in *Magill v. Royal Group of Hospitals and Others* [2010] N.I.Q.B. 10, at para. 107: "It is essential that judges exercise some measure of quality control when assessing on what areas experts are entitled to comment."

[164] *In Re: Welding Fume Products Liability Litigation* (United States District Court for the Northern District of Ohio, Eastern Division, unreported, 8 August 2005). Nearly all of the experts' reports revealed that they read many medical and epidemiological journal articles which studied and discussed the neurological effect of manganese. While this may have been vital to those experts' understanding generally of the issues and background of the litigation, it did not make them experts on that particular subject. Nevertheless, a given expert's tendency to opine about areas outside of their particular expertise did not, by itself, disqualify them from testifying about their true, core area of expert knowledge.

[165] *Bogle and others v. McDonald's Restaurants Ltd.* [2002] E.W.H.C. 490.

processing industries. Certain aspects of his evidence involved factual, non-expert evidence. Mr. Ives omitted to refer to relevant information on the U.K. McDonald's procedure for making tea and on temperature settings. Other parts arguably involved expert opinion evidence, but the court noted that Mr. Ives was an engineer and not a restaurateur. He gave his view on the temperature at which McDonald's should have served their hot drinks having regard to consumer preferences. However, the temperature at which consumers preferred to drink hot drinks was not something within his expertise. He based his view on a published paper which recorded tests done with 250 undergraduates from two large US universities. Those matters on which he did give an expert opinion were in large measure outside his particular expertise, and his opinion was based not on direct testing by him of the cups and lids for defects, but on an indirect analysis focussing on McDonald's specification and the method of the manufacture. The court did not find Mr. Ives an impressive witness.

A high profile case concerning an expert straying outside his field of expertise was where evidence was given by Professor Sir Roy Meadow on the prosecution of Sally Clark for the murder of her two sons. The essential criticism of Professor Meadow's evidence was that he departed from the field of paediatrics, in which he was unquestionably an expert, into the field of statistics, in which he was not. It was subsequently recognised that the conversion of a probability of 1 in 1,000 deaths for one death of a child from Sudden Infant Death Syndrome to 1 in 1 million deaths for two such deaths was only valid if each of the deaths was truly independent of the other, that is without the shared genetic and environmental circumstances of the children being members of the same family. Hence a conversion should only be considered valid where true independence of each event from the other had been established. There was no such independence on the facts. Professor Meadow was not a statistician and had no relevant expertise which entitled him to use the statistics in the way he did.[166]

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[166] *General Medical Council v. Meadow* [2006] E.W.C.A. Civ. 1390. After the quashing of Clark's conviction, Professor Meadow was found guilty of serious

CONCLUSION

Expert evidence is no different from any other evidence. The trial judge may accept it, reject it, or accept some of it and reject other parts of it.[167] The role of the trial judge is to scrutinise the evidence thoroughly and ascribe to it such weight as he thinks it deserves. Thus it is for the judge, not the experts, to decide the critical issues in the case.[168] An expert witness must not be allowed to become the real decision-maker, a surrogate judge. Care must be taken to ensure that an expert witness does not usurp the judge's task of reviewing all the relevant evidence and determining where the truth lies. Although rules of evidence guard against this danger in its most blatant form, the danger of expert evidence replacing judicial truth-finding in more subtle ways remains ever-present, not least that the judge may not completely appreciate all the dimensions of expert testimony and hence not evaluate it as critically as they should.[169] A judge should not be intimidated by an expert's forceful exposition and virtually allow them to decide an issue. This is contrary to the nature of the judicial function.[170] Any evidence, "expert" or not, is only received to provide a foundation for the court's decision-making, not to supplant it or otherwise intrude upon the court's function.[171] Judges decide cases, experts do not.[172]

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professional misconduct by the GMC. He appealed to the High Court, and his appeal was allowed. The GMC later unsuccessfully appealed.

[167] *Taubner Estate (Re)* [2010] A.B.Q.B. 60 (CanLII).

[168] *The Bell Group Ltd. (In Liq) v. Westpac Banking Corporation (No.9)* [2008] W.A.S.C. 239.

[169] McLachlin, "Judging in a Democratic State", Sixth Templeton Lecture on Democracy, University of Manitoba, Winnipeg, 3 June 2004.

[170] *Vadakathu v. George* [2009] S.G.H.C. 79. Nonetheless as Ward L.J. said in *Re B (Care: Expert Witnesses)* [1996] 1 F.L.R. 670: "If there is nothing before the court, no facts or no circumstances shown to the court which throw doubt on the expert evidence, then if that is all with which the court is left, the court must accept it".

[171] *Securities and Futures Commission v. Zou Yishang* [2007] H.K.C.U. 438.

[172] "The Expert Witness in the New Millennium", Paper delivered by Justice A. R. Abadee to the General Surgeons Australia 2nd Annual Scientific Meeting, 2 September 2000, Sydney.

After appropriate consideration of expert evidence, a court must give reasons for the conclusions it has reached. While evidence of an expert may be rejected even where it is unchallenged, the reasons for doing so must be sound.[173] A coherent reasoned opinion expressed by a suitably qualified expert should be the subject of a coherent reasoned response.[174] In *Flannery and another v. Halifax Estate Agencies Ltd.*[175] Henry L.J. said that, where a dispute involves something in the nature of an intellectual challenge, with reasons and analysis advanced on either side, the judge must enter into the issues canvassed before them and explain why they prefer one case over the other. This is likely to apply particularly in litigation where there is disputed expert evidence. Lord Philips M.R. adopted a similar approach in *English v. Emery Reimbold & Strick Ltd*, [176] when he observed that, where there have been conflicts of expert evidence, a judge should provide an explanation as to why they have accepted the evidence of one expert and rejected that of another. It may be that the evidence of one or the other accorded more satisfactorily with facts found by the judge. It may be that the explanation of one was inherently more credible than that of the other. It may simply be that one was better qualified, or manifestly more objective, than the other. Whatever the explanation may be, it should be apparent from the judgment. Where a judge has failed to explain why they have preferred the evidence of expert A to that of expert B, and there is no reasoning and no analysis, this will be considered "a wholly inadequate judicial response" on appeal.[177]

As this article has endeavoured to demonstrate, the assessment of expert evidence involves the consideration of that evidence from a number of perspectives. One of the most comprehensive attempts at summarising the judicial task was that

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[173] *Hksar v.Tsang Ming Hey* [2005] H.K.C.U. 104.
[174] *Eckersley v. Binnie* (1988) 10 Con. L.R. 1.
[175] [2000] 1 All E.R. 373.
[176] [2002] E.W.C.A. Civ. 605.
[177] *Re M-W (A Child)* [2010] E.W.C.A. Civ. 12 at para. 43. In *Wilsher v. Essex Area Health Authority* [1988] A.C. 1074 the House of Lords felt compelled to order a new trial because the judge had left unresolved a conflict of expert evidence which was critical to decision of the case.

by Stuart-Smith L.J. in *Loveday v. Renton and Wellcome Foundation Ltd.*,[178] where the mother of a child with brain damage brought an action against a general practitioner who had vaccinated the child against whooping cough. Faced with eighteen expert witnesses, the judge introduced his approach to the evaluation of their oral evidence by saying:

> In reaching my decision a number of processes have to be undertaken. The mere expression of opinion or belief by a witness, however eminent, that the vaccine can or cannot cause brain damage, does not suffice. The court has to evaluate the witness and the soundness of his opinion. Most importantly this involves an examination of the reasons given for his opinions and the extent to which they are supported by the evidence. The judge also has to decide what weight to attach to a witness's opinion by examining the internal consistency and logic of his evidence; the care with which he has considered the subject and presented his evidence; his precision and accuracy of thought as demonstrated by his answers; how he responds to searching and informed cross-examination and in particular the extent to which a witness faces up to and accepts the logic of a proposition put in cross-examination or is prepared to concede to points that are seen to be correct; the extent to which a witness has conceived an opinion and is reluctant to

[178] [1989] 1 Med. L.R. 117. Another excellent summary of the judicial task is in the case of *Mims v. United States* 375 F.2d 135 (5th Cir 1967) where the court said: "It has been recognized that expert opinion evidence may be rebutted by showing the incorrectness or inadequacy of the factual assumptions on which the opinion is based, the reasoning by which he progresses from his material to his conclusion, the interest or bias of the expert, inconsistencies or contradictions in his testimony as to material matters, material variations between the experts themselves, and defendant's lack of co-operation with the expert. Also, in cases involving opinions of medical experts, the probative force of that character of testimony is lessened where it is predicated on subjective symptoms, or where it is based on narrative statements to the expert as to past events not in evidence at the trial. In some cases, the cross examination of the expert may be such as to justify the trier of facts in not being convinced by him. One or more of these factors may, depending on the particular facts of each case, make a jury issue as to the credibility and weight to be given to the expert testimony; and in determining whether such issue is raised, due consideration must be given to the fact that the trier of facts has the opportunity to observe the witness if he testifies in person".

> re-examine it in the light of later evidence, or demonstrates a flexibility of mind which may involve changing or modifying opinions previously held; whether or not a witness is biased or lacks independence.

Expert opinion evidence is a necessary mainstay of the litigation process. Many cases could not be tried without it.[179] A judicial finding of fact will often be the outcome of a composite evaluation of a large body of oral evidence, including expert evidence, where the assessment of the weight and persuasiveness of each of the expert's testimony is of critical importance.[180] In carrying out such an evaluation, expert evidence must only be given the weight it deserves so that it does not distort the judicial fact-finding process.[181]

[179] *R. v. Abbey* [2009] ON.C.A. 624 (CanLII).
[180] *Thomson v. Christie Manson & Woods Ltd. and others* [2005] E.W.C.A. Civ. 555.
[181] *R. v. Mohan* (1993) 89 C.C.C. (3d) 402 (S.C.C.).