

# Limitations of the Common Law Adversarial Process: How Independent Judicial Research Could Have Avoided the Wrongful Conviction in *R v Mullins-Johnson*

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## ABSTRACT

It is often believed that the common law adversarial process performs efficiently to ensure the truth comes out and that justice is served. However, this was not the case in *R v Mullins-Johnson*. This paper argues that the common law adversarial trial process can actually contribute to wrongful convictions if judicial passivity is strictly adhered to. If the trial judge could have learned about the unreliability of the Crown expert testimony through independent research, he could have intervened to avoid a wrongful conviction.

**Keywords:** Wrongful Conviction; expert evidence; scientific evidence; forensic pathology; Goudge Inquiry; fact-finding; criminal trials; role of judge; judicial intervention; judicial neutrality.

**Note in Style:** To avoid confusion and improve readability, judges are referred to as “he.” However, it should be noted that our judiciary is composed of all genders.

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## I. INTRODUCTION

(Note that this paper is based on the author's LL.M. thesis, Hui-Litwin, H. W.-S. (2018). *The Role of the Judge in Wrongful Convictions: R v Mullins-Johnson*.<sup>1</sup>)

Scientific expert evidence is frequently relied upon nowadays in both civil and criminal court proceedings. Unfortunately, there have been many wrongful convictions as a result of flawed Crown expert testimony. For example, in the United Kingdom, Sally Clark was wrongly convicted of murdering her infants, based on the expert opinion that the chances of two incidents of Sudden Infant Death Syndrome ('cot death') happening to a single family were one in 73 million.<sup>2</sup> In another case, a Dutch nurse, Lucia de Berk was convicted of murdering the infants under her care by poisoning them with digoxin. What led to her arrest was the perception that there was an unusually high frequency of deaths that occur during her shifts. A prosecution expert testified the chances of all the deaths occurring naturally was one in 34 million. This opinion was later debunked after Ms. De Berk spent five years in jail.<sup>3</sup> In Canada, it was discovered that there were many wrongful convictions as a result of the flawed opinions of a pathologist by the name of Dr. Charles Smith. Indeed, the Inquiry into the Pediatric Forensic Pathology in Ontario ('Goudge Inquiry')<sup>4</sup> was created to review the pediatric forensic pathology system.

It is often believed that the common law adversarial process performs efficiently to ensure the truth is revealed and that justice is served. However, this was not the case in *R v Mullins-Johnson*.<sup>5</sup> In this paper, I argue that the

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<sup>1</sup> Hui-Litwin, H W-S (2018). *The Role of the Judge in Wrongful Convictions: R v Mullins-Johnson*. University of Toronto (Canada) ProQuest Dissertations Publishing, 2018. Online: <[hdl.handle.net/1807/91764](http://hdl.handle.net/1807/91764)>.

<sup>2</sup> 'Sally Clark, mother wrongly convicted of killing her sons, found dead at home' Article in *The Guardian* <https://www.theguardian.com/society/2007/mar/17/childrenservices.uknews>; Erica Beecher-Monas also referenced this tragic case in her book *Evaluating Scientific Evidence*, (New York: Cambridge University Press, 2007), p. 12. It is interesting to note that defence called two expert statisticians on appeal to reveal the flaws in the prosecutor's expert pediatrician's evidence, only to be dismissed by the appeal court. It was not until it was discovered that the pathologist had failed to disclose evidence of the infant's infection that Ms. Clark was acquitted in a second appeal.

<sup>3</sup> Jeffrey Rosenthal, 'Probability, Justice, and the Risk of Wrongful Conviction' vol. 12, no. 1, 2 & 3 (2015) *The Mathematics Enthusiast*, 11. Online:<<http://probability.ca/jeff/ftpdire/probjusticepub.pdf>>.

<sup>4</sup> Commission of Inquiry into Pediatric Forensic Pathology, Report (Toronto: Ontario Ministry of the Attorney General, 2008) [Report of Goudge Inquiry].

<sup>5</sup> *R v Mullins-Johnson*, 2007 ONCA 720 (CanLII), 87 O.R. (3d) 425 [Mullins-Johnson].

common law adversarial trial process can actually contribute to wrongful convictions if judicial passivity is strictly adhered to. I argue that the trial judge would likely have learned about the unreliability of the Crown expert testimony through independent research and that he could have intervened to avoid a wrongful conviction. I argue that judicial neutrality should not be synonymous with judicial passivity.

The paper will open with an outline of the *Mullins-Johnson* litigation and a brief introduction of what I believe led to the wrongful conviction.

The third part of the paper introduces the debate on independent judicial research. It includes a commentary on the case *R v Bomyk*<sup>6</sup>. This case is of interest because the British Columbia Court of Appeal was highly critical of the trial judge's use of independent research. I use this case as an opportunity to reflect on the pros and cons of judicial research. I end this section with a suggestion on how independent judicial research can still be included while taking into account the Court of Appeal's concerns.

The fourth part of the paper will provide a detailed look at what happened during the *Mullins-Johnson* trial, I will discuss how the trial judge could have learned that the Crown trial expert's opinion on the time and cause of death were based on faulty foundations if he had accessed the textbooks that were cited at trial. Expert testimony will be analyzed with the help of trial transcript excerpts.

The fifth part of the paper will conclude with my suggestions on how a judge could have intervened in the *R v Mullins-Johnson* hearing in such a way that balances competency in handling scientific expert evidence while preserving judicial neutrality.

## II. MISCARRIAGE OF JUSTICE IN *R V MULLINS-JOHNSON*: BACKGROUND OF THE CASE

On September 21, 1994, William Mullins-Johnson was convicted of first-degree murder. The events began when Mr. Mullins-Johnson was asked to babysit his brother's children one summer evening. The next morning, one of the children, Valin Johnson, was found dead in her bed by her mother. An autopsy was performed by a pathologist, named Dr. Bhubendra Rasaiah. He consulted with several doctors, including Dr. Charles Smith.<sup>7</sup> Less than twelve hours<sup>8</sup> later, Mr. Mullins-Johnson was arrested for first-degree murder, based on the pathologist's opinion that Valin had been

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<sup>6</sup> *R v Bomyk*, 2013 BCSC 1927 [*Bomyk* 2013].

<sup>7</sup> *Mullins-Johnson*, *supra* note 5 at para. 43.

<sup>8</sup> *Ibid* at para. 4.

manually asphyxiated<sup>9</sup> during an episode of anal rape. The pathologist also concluded that the attack took place roughly around 8 to 10 p.m. the evening before. Mr. Mullins-Johnson was the only adult who was with the child at the time, therefore he had the exclusive opportunity to murder the child. Twelve years after his conviction, Mr. Mullins-Johnson was acquitted. It was discovered that the Crown's expert opinions were flawed. According to judgement<sup>10</sup> rendered by the Court of Appeal in 2007, there was insufficient evidence to conclude there was any murder. The fresh expert evidence presented on appeal was so overwhelmingly in favour of the accused that the Crown conceded to the acquittal.

This case shows how flawed testimony can appear to be highly convincing at first glance. There is a natural tendency for a judge (or a jury) to be deferential to an expert of spectacular credentials and accept their testimony without challenge. The Crown expert evidence on the time of death was highly significant in this case, as Mr. Mullins-Johnson was alone with Valin from about 7 p.m. to 9:30 p.m. on the evening before she was discovered dead. Crown expert Dr. Rasaiah's testified that the time of death fell within a narrow two-hour window, which would provide the prosecution with a convincing case of exclusive opportunity for Mr. Mullins-Johnson to commit the alleged murder. Furthermore, when Crown experts testified that the physical evidence such as a bruise on the neck and pinpoint bleeding in the eyelids point to manual strangulation, it is difficult not to conclude the child was murdered. It is interesting to note that the information given by the expert to educate the court (as opposed to his interpretation of the scientific observations) contradicted the existing knowledge already documented in textbooks. This contradiction could have been caught by a judge if he had conducted judicial research. This will be elaborated on in Part 4.

### III. PROS AND CONS OF INDEPENDENT JUDICIAL RESEARCH

#### A. Introduction to Judicial Independent Research

An active engagement of a judge in assessing the substance of the expert evidence is crucial to ensuring adjudication based on the merits. Naturally, to do so, a judge must be able to comprehend the expert evidence itself. Currently, organizations such as the National Judicial

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<sup>9</sup> While the precise definition of the term 'asphyxia' has been debated, in this case, I will use it to denote what was meant by Dr. Bhubendra Rasaiah, the pathologist who performed the autopsy. His definition of asphyxia refers to a mechanical obstruction of airways, such as suffocation, strangulation or chest compression.

<sup>10</sup> *Mullins-Johnson*, *supra* note 5 at para. 6.

Institute and the Canadian Judicial Council offer courses and resources to help judges handle scientific evidence.<sup>11</sup> However, if the judge had received specialized education on forensic pathology, how would he bring that knowledge into the trial process? Furthermore, can he supplement his knowledge while presiding on a trial to refresh his learning and to keep up to date with the most current scientific knowledge? The common law is content with granting a judge the power to *exclude* evidence (gatekeeping). However, if a judge were allowed to introduce information into the trial process through independent research, would this not appear to be *adding* evidence to the trial process by a judge?

While it is beneficial for a judge to have some basic education in the various areas of sciences, it would be impractical for judges to be well-versed in all forensic disciplines. There are several ways in which judges acquire specialized knowledge. One is from what they “learned” in previous trials that they presided over. A second way is through continuing professional education courses (“CLE”) as mentioned above. A third way, and the most controversial one, is that judges may gain knowledge through their own research while they are presiding over a trial. A judge will often be tempted to conduct independent research if he is motivated to fully understand the evidence at hand for two reasons: (1) CLE’s will often only provide basic and generalized knowledge in a particular scientific area, and hence, specific details on a particular topic may require more tailored research; (2) ever-evolving scientific progress means that what a judge learned a few years ago at a CLE may be obsolete by the time they preside at a trial.

According to the literature,<sup>12</sup> opinions are divided amongst judges themselves over whether they should do their own independent research. Some argue that a judge (and jury) should have access to the whole picture. Therefore, if the parties were unable to provide this, due to a lack of resources or incompetence, then surely a judge should be allowed to do his own research to ensure that all relevant information is available for a fair analysis of the facts. Others argue that allowing independent research violates some of the most basic tenets in the trial process, including the

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<sup>11</sup> The National Judicial Institute webpage on judicial education. Online: <<https://www.nji-inm.ca/index.cfm/judicial-education/judicial-education-in-canada/?langSwitch=en>>; Canadian Judicial Council webpage on seminars. Online: <<https://cjc-ccm.ca/en/what-we-do/professional-development>>.

<sup>12</sup> Edward K. Cheng, “Should judges do independent Research on Scientific Issues?” (2006) 90:2 *Judiciature* 58. 28 *Rev. Litig.* 131 (2008-2009); Elizabeth Thornburg, “The Curious Appellate Judge: Ethical Limits on Independent Research” 28 *Rev. Litig.* 131 (2008); Wayne K. Gorman, “How much Independent Judicial Research is Appropriate?” 52 *Ct. Rev.* 4 (2016).

party prosecution principle, judicial neutrality, and that a judge should only act as an adjudicator, and not also as a witness and an advocate.

## **B. Advantage of Judicial Independent Research**

In a common law trial, facts are introduced in a trial through a very limited and controlled manner. A judge is only allowed to consider the evidence before him, and cannot bring in any knowledge or information from his own research. Hence, there is a risk that any gap in the factual record (either intentional or inadvertent) has no way of being filled. The process works if both sides are equally well-resourced and can provide the court with all the necessary and relevant information. It also assumes the rules of procedure and evidence would expose any shortcomings in expert opinions. Indeed, in *Daubert*, the court was of the opinion that “Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.”<sup>13</sup> However, if the parties fail to provide all the relevant information required for fair adjudication, the court will be forced to make a decision with incomplete facts. In addition, as mentioned previously, studies have shown that trial safeguards have been ineffective in exposing flawed expert opinions.<sup>14</sup> Therefore, it seems sensible that one should allow the judge to conduct research that will fill in gaps of knowledge in cases where parties were unable to provide full information. However, there are some drawbacks, as will be discussed below.

## **C. Drawbacks of Independent Judicial Research**

### ***1. Uncertainty and Inconsistency***

Allowing judges to conduct their own research creates uncertainty and inconsistency. Firstly, it is impossible to know beforehand what they will discover,<sup>15</sup> and as a result, it becomes very difficult for parties (counsel) to prepare to respond to the information that the judge has learned. Although one may argue that fairness would be achieved if the judge is transparent and discloses all the information he found, with all parties given time to respond, there is no guarantee that the judge will necessarily disclose every single detail he discovered. There is also the problem of inconsistency

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<sup>13</sup> *Daubert v Merrel Dow Pharmaceutical, Inc.*, 509 US 579 at 596.

<sup>14</sup> G. Edmond, David Hamer and Emma Cunliffe, “A Little Ignorance is a dangerous thing: engaging with exogenous knowledge not adduced by the parties” (2016) 25:3 Griffith Law Review at 385.

<sup>15</sup> Thornburg, *supra* note 12 at 184.

among judges. Judges are not trained scientists, who will have varying levels of scientific competence. Moreover, if judges resort to internet searches, they may not recognize which sources are truly reliable. All these factors contribute to the uncertainties generated by judicial independent research.

## ***2. Lack of Fair Notice***

Another danger in allowing judicial independent research is the potential of inadequate notice. For example, the *Criminal Code of Canada*, s.657.3(3)<sup>16</sup> provides that when parties rely on experts, they are to supply the expert reports beforehand, so that the opponent has time to formulate a rebuttal or make an informed decision on litigation or negotiation strategy. This is particularly important for expert opinions, as counsel will often need time to consult with their own experts. Questions posed by a judge at expert witnesses during trial may have the effect of turning the judge into an advocate, especially if the expert being challenged by the questions is not given time to prepare a full response to the information.

## ***3. Misinterpretation of the information due to bias and/or lack of skill***

There is the danger that a judge may inadvertently research only the sources that confirm his own biases.<sup>17</sup> In areas of science where there are controversies, there is a danger that the judge may choose sources that present only the side that he prefers. When a judge consults dictionaries, it is easy to see there should not be any disputable matters. However, even in medical encyclopedias and authoritative texts, there is concern that the information has since been superseded with more up-to-date research, that is only available in specialized journals. Usually, only experts would be knowledgeable as to the authoritativeness of a text. Furthermore, there is also the danger of a lay judge misinterpreting or misunderstanding technical information.<sup>18</sup>

## ***4. Undermining of Party Prosecution Principle***

Allowing a judge to do independent research also creates a question as to who has the burden of adducing evidence. One of the foundations in the adversarial process is the party prosecution principle: the parties bear the ultimate burden of providing all the evidence necessary for fact-finding. Introducing the possibility that judges can also contribute to fact-finding will add increased uncertainty to the parties, as they are no longer in control

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<sup>16</sup> *Criminal Code*, RSC 1985, c C-46.

<sup>17</sup> Thornburg, *supra* note 12, at 184 and 198. Judges, like experts, can also be prone to confirmation bias.

<sup>18</sup> *Ibid* at 185 and at 199.

of the evidence. Parties will not know what a judge might find in their own research, and they cannot control how that external research may influence the judge's mind, especially if the judge does not disclose the entirety of their research.<sup>19</sup>

Having reviewed the pros and cons of independent judicial research above, we now examine briefly the trial and appellate decisions in *R v Bornyk*.<sup>20</sup> This case is relevant because the trial judge discovered information that he believed to have undermined the reliability of the Crown expert, which he used to come to an acquittal. The Court of Appeal overturned his decision. I will take this opportunity to learn from this case to derive an approach in which a judge can rely on independent research in such a way that addresses the Court of Appeal's concerns.

#### **D. Unique Case of Trial Judge relying on independent research: *R v Bornyk***

*R v Bornyk* serves as a good example of how a judge who has been educated on the limitations of a forensic method was able to recognize the many weaknesses in an expert opinion. He actively engaged in critical analysis of the substance of the expert's opinion, and acquitted the defendant, after finding that the expert evidence was unreliable. Unfortunately, his diligence was not rewarded, as the B.C. Court of Appeal overturned his decision.

This is a break-and-enter case. A home in Surrey B.C. was broken into while the homeowners were away on vacation. The entire house had been ransacked, but the police found only one latent fingerprint on the plastic wrap of a toy box in the house. A large portion of the print was located in a rippled area of the wrap, resulting in only a partial part of the fingerprint that could be used for analysis.<sup>21</sup> The print was run on a computer against a database of known prints called the Automated Fingerprint Identification System (AFIS). Although there was no positive result when the print was first run in July 2010, one did arrive in early May 2011. The latent print was found to match known prints obtained from the accused in 2006. Alerted to this result, the RCMP fingerprint expert, Corporal Wolbeck did a comparison but using another set of prints from the accused which was taken in 2010.<sup>22</sup> He testified that he used the ACE-V method in his analysis, that he has never made mistakes and his result was verified by another

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<sup>19</sup> *Ibid* at 184.

<sup>20</sup> *Bornyk* 2013, *supra* note 6 and *R v Bornyk*, 2015 BCCA 28 [*Bornyk* 2015].

<sup>21</sup> *Ibid* at para. 9.

<sup>22</sup> Presumably, the accused had been arrested for some other crime, once in 2006 and once in 2010, which resulted in his prints being taken and entered into AFIS.



RCMP officer. Corporal Wolbeck described how fingerprint comparisons are done: individualization can be accomplished by comparing details such as the paths of the friction ridges, whether they split off or just ends, etc. According to Corporal Wolbeck, he concluded that the latent print and the known print both came from the accused's finger.

This trial is striking for two reasons. Firstly, the accused was linked to the crime by one piece of evidence only: a single latent fingerprint found at the home. Also unique in this trial was the great length to which the judge engaged in the scientific evidence. This was a judge-only trial. As such the judge has dual roles of assessing the admissibility and weight of the evidence. When the case was on reserve, the trial judge, Justice Funt became aware of scholarly articles which described the limitations of fingerprint analysis. He learned that there is an inherent subjectivity to the interpretation. Comparisons are not as simplistic as one may expect. For example, even when the same finger is used to make two prints in a row, they will not perfectly match. Thus, when an examiner analyses two prints to decide whether there is a match "within tolerance", his conclusion has a subjective element, as it is dependent on his experience and knowledge.<sup>23</sup>

In applying what he learned from the articles, Justice Funt pointed out the existence of many "troubling aspects" of the evidence, such as institutional bias; the use of a photocopy of the print instead of the original; non-disclosure of the lab notes to defence; omission of calling the verification of the other RCMP agent as witness amounted to hearsay; possible existence of exculpatory aspects in the areas of the print that was not used; whether the conclusion of a "match" meant that there was zero possibility the latent print could not have come from someone other than the accused; why only the 2006 set of known prints were used, over the 2010 prints, and why not use both; and finally, the discrepancy between the two prints, which consisted of two gaps.<sup>24</sup> In other words, instead of complacently trusting the Crown expert's opinion and assuming fingerprint evidence must be reliable due to their long history of use in courts,<sup>25</sup> he

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<sup>23</sup> *Bornyk 2013, supra* note 6 at para. 36.

<sup>24</sup> As per Justice Funt's reasons: If one goes to the ridge immediately to the left of the respective red dots marking the centre of the delta on the latent and the known fingerprints and traces a line towards the top of the page, on the known fingerprint there is a continuous ridge, whereas on the latent fingerprint there is a gap, a further ridge, another gap, and then a further ridge. See *Bornyk 2013, supra* note 20 at para. 56.

<sup>25</sup> G. Edmond notes that judges prefer to rely on past decisions and commentary instead of scrutinize long established techniques, such as fingerprint evidence. Gary Edmond, "Pathological Science? Demonstrable Reliability and Expert Forensic Pathology Evidence" Research Paper for the Commission of Inquiry Into Pediatric Forensic Pathology, 2007 at 14.

critically evaluated the expert's conclusion with questions that would not have been apparent to a lay judge who is ignorant of the issues particular to fingerprint evidence. Moreover, he examined the actual evidence himself. He saw that there were clear discrepancies between the known print from the accused and the latent print. This is the kind of substantial engagement that goes to the very heart of the evidence. He is not simply relying on secondary indicia, such as the credentials of the expert. Indeed, this sort of engagement of the substance of an expert's opinion was what was recommended by the Scottish Fingerprint Inquiry, which stated:

It is recommended that the test be adopted that features (or 'events') on which examiners rely should be demonstrable to a layperson with normal eyesight as being observable in the mark. The fact-finder can trust the evidence of his own eyes: either he sees some 'event' in the location indicated or he does not. If not, the evidence of the examiner on that point can be discounted.<sup>26</sup>

Unfortunately, Justice Funt's diligence was not rewarded. The B.C. Court of Appeal set aside the acquittal, citing that several fundamental principles of the trial process were violated. One was the party prosecution principle: the only evidence that a fact-finder is entitled to is that which is presented by the parties.<sup>27</sup> Another principle that was violated was that the trial judge cannot simultaneously be the adjudicator, a witness and an advocate. A judge in the common law trial remains above the fray and stays neutral by being the passive observer. The Court observed that the act of self-directed research causes a judge to assume "the multi-faceted role of 'advocate, witness and judge'."<sup>28</sup>

As to the use of textbooks and other articles, the Court of Appeal cites from *R v Marquard*:

The proper procedure to be followed in examining an expert witness on other expert opinions found in papers or books is to ask the witness if she knows the work. If the answer is "no", or if the witness denies the work's authority, that is the end of the matter. Counsel cannot read from the work, since that would be to introduce it as evidence. If the answer is "yes", and the witness acknowledges the work's authority, then the witness has confirmed it by the witness's own testimony. Parts of it may be read to the witness, and to the extent they are confirmed, they become evidence in the case.<sup>29</sup>

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<sup>26</sup> *Bornyk 2013, supra* note 6 at para. 38.

<sup>27</sup> As commented by Elizabeth Thornburg, counsel selects the evidence to be adduced, as such, the factfinder will rarely ever see the whole truth. Indeed, in the Mullins-Johnson case, as mentioned in Part IV, even when the jury asked specific questions, the court declined to have them answered. The jury asked whether Dr. Rasaiah took another temperature reading.

<sup>28</sup> *Ibid* at para. 10.

<sup>29</sup> *R v Marquard*. 1993 CanLII 37 (SCC), [1993] 4 S.C.R. 223 at 251, 108 D.L.R. (4th) 47.

The Court of Appeal noted the danger of a trial judge misapplying what he learned from these articles.<sup>30</sup> After all, this is precisely why the expert is sought in the first place. In particular:

While it may be desirable that a judge personally observe the similarities and differences between the latent point and known point, such examination should be guided by a witness so as to avoid the trier of fact forming a view contrary to an explanation that may be available if only the chance were provided to proffer it.<sup>31</sup>

In sum, the Court of Appeal was mainly concerned with two issues: that Justice Funt relied on evidence not adduced by the parties and not properly tested in court, and that he performed his own analysis of the fingerprints without the aid of the expert.

### **E. Judicial Intervention: Learning from *R v Bornyk***

In a common law trial, the roles of the judge, witness and advocate are distinct. Each must be taken on by entirely separate individuals. Furthermore, the fact finder is restricted to base its decisions solely on the evidence adduced by the parties. This principle works well when only lay witness testimony is involved. Lay testimony is based on direct observations made by witnesses in an ordinary sense, without the use of any specialized equipment. Lay testimony can be understood and assessed by a factfinder without any specialized knowledge.

Expert testimony, on the other hand, has an additional layer of complexity. The technical nature of expert evidence makes it difficult for lay factfinders to comprehend. It also creates a risk that experts could mislead the factfinder by taking advantage of the latter's ignorance. This vulnerability is one of the main reasons why educational programs are offered to enhance judicial scientific literacy. However, it is doubtful that such programs will cover whatever fine technical details applicable to the case at hand. Therefore, the judge would likely need to conduct research at the time when he is presiding over a trial in order to supplement his knowledge. In addition, since science is continuously evolving, the judge would require up-to-date knowledge of the latest advances in the area in question. Therefore, a judge who aims to fully engage in the technical aspects of the evidence would necessarily need to supplement CLE knowledge with current research. Forbidding judges to conduct independent research while presiding over a trial is inconsistent with the values and goals behind judicial education in scientific literacy. Ignorance about the forensic method at issue can lead the judge to reliance on

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<sup>30</sup> *Bornyk 2015, supra* note 20 at para. 14.

<sup>31</sup> *Ibid* at para. 18.

common sense, or any inaccurate scientific knowledge they gained from previous trials.

As we will learn from the Mullins-Johnson case, common sense is insufficient in evaluating scientific evidence, and there is no guarantee that the scientific teachings given by experts in a trial setting are accurate and reliable. Ignorance can also lead a judge to be unquestioningly deferential to the expert, resulting in blind acceptance of the expert's teachings or conclusions. Had Justice Funt not learned about the subjectivity inherent in the process from his own research,<sup>32</sup> or that the Scottish Fingerprint Inquiry had recommended that any feature used in comparison should be demonstrated to the lay fact-finder so that he can see it for himself, he may well have believed that fingerprint comparisons may be completely beyond the capability of a layperson, and that the expert's conclusion was totally accurate. It is difficult not to simply accept an expert's opinion when he testified that he has "never made an error"<sup>33</sup> or he would have been removed from the RCMP's program.

On the other hand, as articulated in *Bornyk 2015*, independent research raises the spectre of judicial partisanship. Bringing in the independent research which caused Justice Funt to doubt the expert's opinion appears to be advocating for the defence. There is also the danger that a lay judge may misunderstand the scientific knowledge gleaned from textbooks. How then can we ensure a judge's ability to adjudicate competently, which necessitates his need to consult independent sources, and preserve judicial neutrality?

In my view, I argue that Justice Funt was right to transparently raise his concerns about the expert evidence to counsel and to cite the sources which led him to his reasons. After all, he could have rejected the expert's conclusion without referring to any independent articles he consulted. Indeed, he could also have simply rejected the expert's conclusion based on common knowledge, citing the discrepancies in the prints as support for reasonable doubt to merit an acquittal. Instead, he frankly disclosed what sources he used. His reason for rejecting the expert's evidence was not just based on the difference of the prints alone. It was also based on the many procedural factors which cast doubt on the reliability of the conclusion.

Even though I am in favour of Justice Funt's diligence in engaging with the merits of the evidence, I argue that the expert witness should have been recalled and given the chance to address his concern over the discrepancies

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<sup>32</sup> Justice Funt learned of the uncertainties due to examiner subjectivity from "Expert Working Group on Human Factors in Latent Print Analysis. Latent Print Examination and Human Factors. U.S. Department of Commerce, National Institute of Standards and Technology, Washington, D.C. 2012. See *Bornyk 2013*, para. 36.

<sup>33</sup> *Bornyk 2013*, supra note 6 at para. 23.

between the two prints. Although he gave time for counsel to respond to his concerns, I agree with the Court of Appeal that there is a danger that the discrepancies in the prints had a valid explanation, which Justice Funt did not consider because the expert was never given the chance to respond. After all, fingerprint analysis is specialized knowledge. Fairness requires a judge to consider a response from both sides. How impartiality in the judicial role can be preserved in independent judicial research will be discussed further in Part 5 of this paper, after we examine the *R v Mullins-Johnson* case in detail below.

#### IV. *R v MULLINS-JOHNSON* EXPERT EVIDENCE

In this Part, I will present both the Crown's trial expert evidence and the Appeal expert evidence on the time of death and cause of death. I will discuss how independent research could have allowed a trial judge to flush out the evidence necessary to avoid a miscarriage of justice. Before proceeding I will first introduce the reader to the basic concepts behind the three commonly used indicators to determine the time of death.

##### A. Time of Death: Livor, Rigor and Algor Mortis

Forensic science relies on three indicators to determine the time of death: livor, rigour and algor mortis. The information is based on two textbooks on forensic pathology used at trial, Werner Spitz's textbook titled 'Spitz and Fisher's Medicolegal Investigation of Death', 3<sup>rd</sup> edition, published a year before the trial,<sup>34</sup> and 'The Essentials of Forensic Medicine', authored by Knight, Polson and Gee, published less than 10 years before the trial.<sup>35</sup>

There are three methods used to estimate the time of death based on the rate of physical and chemical changes in the body after death.<sup>36</sup>

(1) Livor Mortis: the purplish skin discoloration caused by post-mortem settling of blood

(2) Rigor Mortis: onset and fading of the stiffness of muscles

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<sup>34</sup> Werner Spitz (editor), 3<sup>rd</sup> edition Spitz and Fisher's *Medicolegal Investigation of Death. Guidelines for the Application of Pathology to Crime Investigation* (Springfield, Illinois: Charles C Thomas Publisher, 1993) [Spitz, *Guidelines*].

<sup>35</sup> C Polson, B Knight and D McGee, *The Essentials of Forensic Medicine*, 4<sup>th</sup> ed (Pergammon Press, 1985) [Polson, *Essentials*].

<sup>36</sup> These three methods are still being taught to forensic science students as being currently used. The author was enrolled in the Introductory Forensic Science course at University of Toronto in 2016. The textbook used, (Saferstein, Richard. *Criminalistics. An Introduction to Forensic Science*, 11<sup>th</sup> ed. (Pearson Education, 2015)) also described these methods used to estimate time of death, at 108-110.

### (3) Algor Mortis: the rate of cooling of the body of the deceased

#### 1. *Livor Mortis*

When a person dies, the circulation of the blood stops. The blood then settles and accumulates in blood vessels due to gravitational forces. Such accumulation in the blood vessels (capillaries) under the skin causes the skin to take on a purple or red-purple colour.<sup>37</sup> This phenomenon is known by various terminology.<sup>38</sup> In this paper, I will use the terms lividity and livor mortis. If the deceased's body is lying on its back, the settling of the blood will give rise to a generalized purple colour on the back of the body, except in areas where the body is pressed on the supporting surface, such as the shoulder blades and buttocks.<sup>39</sup> Similarly, if a body was lying such that the face and the front of the body face the ground, ('prone' position), lividity will be present in the front ('anterior') areas of the body. Livor mortis has been documented to be apparent anywhere from 20 minutes to several hours after death<sup>40</sup> and is complete anywhere from 6 to 12 hours.<sup>41</sup> The colouring may shift in the early stages. This means that if the body was moved, the discoloration will move to other areas of the skin. It also means that the purple colour on the skin could be 'blanched', that is, the purple colour disappears upon points of compression. It is 'fixed' after 8 to 12 hours.<sup>42</sup> In addition, the tiny capillaries under the skin could burst, giving rise to pin-point bleeds or petechiae hemorrhages, called 'Tardieu Spots.'<sup>43</sup>

#### 2. *Rigor Mortis*

The stiffening of the muscles and joints is another time-dependent process that occurs after death. This phenomenon is known as post-mortem rigidity or 'rigor mortis.' When a body dies, the muscles become relaxed, or 'flaccid'<sup>44</sup> but then become stiff or rigid, which then 'freezes the joints.'<sup>45</sup> The time of onset varies, with different textbooks citing different time

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37 C Polson et al note that livor mortis occurs not only in blood vessels under the skin, but also in the blood vessels of organs. This is significant, as lividity can be misinterpreted as injury or other symptoms of disease. Polson, *Essentials* at 13.

38 Other names include post-mortem hypostasis, postmortem lividity, postmortem staining, suggillation, livor mortis. Spitz, *Guidelines supra* note 34 at 23; Polson, *Essentials supra* note 35 at 13.

39 Polson, *Essentials supra* note 35 at 13.

40 Spitz, *Guidelines, supra* note 34 at 24.

41 Polson, *Essentials supra* note 35 at 13.

42 Spitz, *Guidelines supra* note 34 at 24.

43 *Ibid* at 24.

44 *Ibid* at 26.

45 *Ibid*.

frames, anywhere from within half an hour to 4 hours after death.<sup>46</sup> The process maximizes within 12 hours.<sup>47</sup> It gradually wanes, although the time taken for this to occur also varies, anywhere from 12 hours<sup>48</sup> to 60 hours.<sup>49</sup> It is clear that the time frame in which livor and rigor mortis occurs varies widely. Nevertheless, the fact that there is a time dependence makes it tempting for pathologists to use the observations of livor and rigor mortis to estimate the time of death.

### *3. Algor Mortis*

Finally, there is the use of post-mortem body temperature as a method of estimating the time of death. The theory is that the deceased body cools down and comes to an equilibrium temperature with its surroundings. The process has been termed ‘post-mortem cooling’ or ‘algor mortis.’ Hence, if one assumes a starting body temperature of 98.6°F, one could theoretically perform a retrograde estimation of the time of death, given the temperature of the deceased and the time that the temperature was taken. As intuitive and appealing as this may be, academic literature has observed numerous factors that can affect this rate of cooling, such as environmental temperature, clothing of the deceased, size of body, position of body etc.<sup>50</sup> Rates of cooling have been quoted to be anywhere from 1°F to 2.5°F per hour.<sup>51</sup>

## **B. Trial Expert Evidence on the Time of Death: Livor and Rigor Mortis**

Crown trial expert, and pathologist Dr. Rasaiah, testified that the time of death was between 8-10 p.m. the night before Valin was discovered dead. His testimony consisted of both general teaching of the scientific concepts and his application of these concepts to the case at hand. (To distinguish when his testimony is a “teaching” versus when it is an opinion based on his analysis, I will use the terms “teach” and “opine” respectively instead of “testify”.) He taught that livor mortis ‘begins normally around two hours and said to be fixed around 12 hours’ from the time of death.<sup>52</sup> Applying to the case at hand, he opined as follows: “All I can say is that from the post mortem, fixed post mortem staining of the front of the body, that the body

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<sup>46</sup> *Ibid*; Polson, *Essentials supra* at note 35 at 15.

<sup>47</sup> Spitz, *Guidelines supra* note 34 at 26.

<sup>48</sup> *Ibid* at 26.

<sup>49</sup> Polson, *Essentials supra* note 35 at 15.

<sup>50</sup> Spitz, *Guidelines, supra* note 34 at 22-23.

<sup>51</sup> *Ibid* at 22.

<sup>52</sup> Trial Transcript of *R v Mullins/Johnson*, Evidence of Dr. B. Rasaiah, at 284, lines 15-20.

had been in that position in excess of 12 hours.”<sup>53</sup> Despite his comment on the lividity being fixed, he also noted that the staining had shifted when he saw the body the day after the autopsy.<sup>54</sup>

Q: When you examined the body, you did the post mortem examination, where was the staining?

A: The fixed staining was in the front of the face, chest and abdomen, and there was minimal blue staining on the back, which was not fixed.

Q: Well, did you see the body the next day?

A: Yes.

Q: Did you note where the staining was the next day?

A: Yes, the next day the staining was more prominent in the back, because the body has been lying on its back.

His opinion on the time of death also took into account the observed rigor mortis:<sup>55</sup>

Q: How long does it [rigor mortis] take, when does it start?

A: It ...usually rigor mortis appears in about one-and-a-half to two hours, and become maximal around, is easily detected and maximal around 12 hours. And after 12 hours or so, you begin to get relaxation of the smaller muscles of the face, neck.

Q: When did you see the body...at what time?

A: at 12:55 pm on the 27<sup>th</sup>.

Q: And rigor was where?

A: There was no rigor mortis in the face or neck but was present in the upper limbs and lower limbs, and my estimation was that post mortem death interval would be an estimate and the range would be 15-17 hours.

Q: 15-17 hours from when?

A: From the post mortem examination.

Dr. Rasaiah thus estimated the time of death to be 8-10 p.m. on June 26, based on his observation that the rigor mortis was beginning to fade in the face and neck, and his teaching that rigor mortis fades after 12 hours of death. He did not give any reason as to why he chose the particular interval of 15-17 hour mark as the range for the time of death.

At trial, both defence experts testified that these methods are highly unreliable to the time of death as these processes are variable and prone to subjective interpretation.<sup>56</sup> Similarly, at the 2007 appeal, the defence experts

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<sup>53</sup> *Ibid* at 287 lines 20-25.

<sup>54</sup> *Ibid* at 287 lines 1-15

<sup>55</sup> *Ibid* at 289, lines 1-5.

<sup>56</sup> Trial Transcript of *R v Mullins-Johnson*, Evidence of defence expert Dr. F. Jaffe, at 575, lines 18-25, at 575, lines 10-15. Frederick Jaffe, Report, Exhibit #32, Trial transcript of *R v Mullins-Johnson*.



all agreed with the trial defence experts in that these methods could not be used to arrive at a time of death window as precise as 8-10 pm. One of the appeal defence experts, Prof. Bernard Knight, cited a study<sup>57</sup> that noted that these benchmarks all suffer from extreme variability, where fixation can occur between 1 to 20 hours. As for rigor mortis, Prof. Knight cited a study that opinions on the timelines of rigor vary widely.<sup>58</sup>

Another defence expert, Dr. Butt also cited from a 2001 textbook<sup>59</sup> that fixation of lividity occurring at the 8-12 hour is only a generalization.<sup>60</sup> In analyzing photographs which showed the actual lividity pattern on Valin's body,<sup>61</sup> he noted that there had been movement of the lividity onto Valin's back. This means that Dr. Rasaiah's conclusion that the time of death was more than 12 hours based on his observation of fixation was unreliable. (Recall Dr. Rasaiah's own testimony above where he stated that he had observed the shifting of the lividity the following day at the morgue.) As for rigor mortis, Dr. Butt noted a possible confounding factor in using rigor mortis as time estimation. The absence of rigor in the face and neck may be because the body had been moved several times, rather than a consequence of the natural relaxation process. His opinion was that lividity and rigor cannot be used to estimate the time of death.

### **C. How independent research by a judge would have exposed the unreliability in evidence on livor and rigor mortis**

To arrive at a guilty verdict, the jury must have given significant weight to Dr. Rasaiah's opinion that the time of death was between 8-10 p.m., since that time interval coincided with the time Mr. Mullins-Johnson was alone with Valin. Recall that no other experts supported the use of these three methods to give a narrow two-hour window as a time of death. Therefore, we now ask: why was the trial defence experts' opinion not accepted, but the appeal defence opinions were?

One important factor may be that the appeal experts' knowledge of the variability was supported by independent academic literature. Prof. Knight and Dr. Butt cited various textbooks on the nature of the extremely wide variability in livor and rigor mortis, which supported why such methods could give no meaningful time of death estimates.

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<sup>57</sup> *Ibid* at 5.

<sup>58</sup> *Ibid* at 4.

<sup>59</sup> *R v Mullins-Johnson*, 2007 ONCA 720, 87 OR (3d) 425, (John C. Butt, Report, June 1, 2006, in 'Joint Record Vol.2. Pathologists' Reports and Correspondence (And Related Report of Dr. Zehr)').

<sup>60</sup> See section A.i.in Dr. Butt's report at 1.

<sup>61</sup> See p.2 of report, which noted that it was photo VMJ 37.

In contrast, at trial, none of the experts cited specific independent sources on the issue of livor and rigor mortis as a time of death estimate. Dr. Rasaiah's opinion was presented to the court dogmatically. He taught that lividity starts around 2 hours and is fixed around 12 hours, but did not give any independent support as to why one should accept that this calculation is accurate. He provided no details as to the variations well known in the pathology field, nor the source of his knowledge. Indeed, years after the trial, in response to the review of his opinion for the 2007 appeal, he repeated his claim that the three methods are used all over internationally. Nevertheless, he did not give any specific sources, nor provide the actual Report from the Coroner's Act that he claimed relies on estimations from these methods.<sup>62</sup> Rebuttal from the trial defence experts also suffered from a lack of independent support. Pitting bare opinions against each other forces a factfinder to pick between them, based on indirect factors (heuristics), such as who has better credentials, or the experts' general demeanour. To assess whether livor and rigor can be used to estimate the time of death, a factfinder needed substantiation that this method actually works and has been tested. Looking at the trial testimony, neither side gave independent support that what they are saying is accurate and reliable. There was no testimony related to whether the knowledge they are relying on is the up to date, state-of-the-art knowledge reflected in the forensic pathology community. For example, in this case, the judge could have asked the experts for independent support (which was not asked by the opposing counsel), rather than being completely passive.

We see the importance of independent support in the appeal defence expert evidence. Hence, it follows that to evaluate an expert opinion, it matters whether the opinion (the knowledge it is based on) is supported by independent literature. It should be noted here that if the trial judge had been allowed to review the textbooks used by counsel, such as the textbook by Spitz, he would have learned that the current knowledge on livor and rigor mortis was contradictory to Dr. Rasaiah's evidence. Spitz noted that fixation of lividity occurred in as little as 8 hours<sup>63</sup>, not 12 hours as Dr. Rasaiah suggested. Spitz noted that there was great variability in the time it takes for the stiffness to fade, which leads one to wonder what basis Dr. Rasaiah had to support his time of death estimate to the narrow window of "15-17 hours." Spitz wrote: "The variability of postmortem rigor makes its

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<sup>62</sup> *R v Mullins-Johnson*, 2007 ONCA 720, (Bhubendra Rasaiah. Letter and Report to Director of the Ministry of the Attorney General, Kenneth Campbell (September 19, 2005) 'Joint Record Vol.2. Pathologists' Reports and Correspondence (And Related Report of Dr. Zehr)') at 4.

<sup>63</sup> Spitz, *Guidelines*, *supra* note 34 at 24.

use as a postmortem clock rather tenuous, to be considered only in conjunction with other timing indices.”<sup>64</sup> The Polson text noted that rigor is established in 6 hours and lasts about 36 hours. It also noted that factors such as temperature, humidity and air currents and the type and volume of muscle affect the rate of onset and disappearance (‘passing off’) of rigor.<sup>65</sup> If this independent information on rigor mortis had been presented and brought to the factfinder’s attention, it would have raised doubt about Dr. Rasaiah’s opinion that the time of death was 15-17 hours from the time of autopsy (1 p.m.).

#### **D. Rate of Body Cooling (Algor Mortis): Trial testimony**

As seen in the previous section, factors determining livor and rigor mortis are highly variable, and their interpretation is prone to the subjectivity of the observer. Therefore, it may seem that quantitative data, such as the body temperature of the deceased’s body would offer a more accurate and objective estimate of the time of death. In addition, the availability of a mathematical formula that could be applied to describe the cooling rate further adds to the perception that this method of estimating the time of death has a higher degree of accuracy. However, there is also controversy about the reliability of this method. As in the case of livor and rigor mortis, it was only Dr. Rasaiah who was confident that the deceased’s body temperature could give a 2-hour estimate of the time of death.

Dr. Rasaiah opined that the time of death occurred between 8 to 10 p.m. He explained that the temperature of the deceased can be measured and applied in a simple mathematical formula to give the post-mortem interval: “The calculation is that for every hour there’s a drop in the body temperature of 1.5 degrees Fahrenheit. So for every hour the body cools 1.5 degrees Fahrenheit. So by using that a figure is arrived at as to estimated post mortem death interval.”<sup>66</sup> The relationship can be expressed this way (also known as the Moritz formula):

$$\begin{aligned} & \text{No. hours since death} \\ & = \frac{\text{ante mortem body temp} - \text{deceased body temp}}{\text{Rate of cooling of deceased body}} \end{aligned}$$

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<sup>64</sup> *Ibid* at 28.

<sup>65</sup> Polson, *Essentials*, *supra* note 35 at 15.

<sup>66</sup> Trial Transcript of *R v Mullins-Johnson*. Evidence of Dr. B. Rasaiah at 281, lines 10-15 [Trial Transcript].

In other words, the formula depends on a constant (or fixed) rate of cooling. He subtracted the rectal temperature of 82°F which was taken by the Coroner<sup>67</sup> at around 8 a.m. at the Johnson home from the normal, *average* body temperature of 98.4°F, *not* Valin's actual antemortem<sup>68</sup> body temperature, which was unknown. The difference was divided by the constant rate of 1.5°F per hour, giving an answer of 11 hours since the time of death. Counting backwards from 8 a.m., the time the rectal temperature was taken, the time of death was thus approximately 9 p.m. the evening.<sup>69</sup> Dr. Rasaiah testified that even though the room temperature was not measured, the estimate was valid, because the internal temperature of the body is not affected unless the room temperature was extreme, and the fact that Valin did not test positive for any natural disease.<sup>70</sup>

### **E. How Independent Research by a Judge Could Have Exposed the Flaws in Crown Expert Evidence on Post-mortem Body Cooling**

Dr. Rasaiah's evidence on the time of death based on the rate of cooling of the deceased body was compelling. His opinion was further supported by his observations of lividity and rigor to corroborate the time of death interval to be 8-10 p.m. It may at first glance appear that it could be difficult to challenge his opinion. He provided a positive, concrete answer: a two-hour time range that seemed plausible. Dr. Rasaiah's evidence may have carried more weight than the other experts because of its relative simplicity in presentation, compared with the opinions of the other defence experts. Dr. Rasaiah's opinion was simple, direct, and easy to understand. He did what an expert was expected to do: provide a tangible answer to the court on a time range of when death occurred. In contrast, all the other experts claimed the time of death cannot be estimated at all, and offered no definitive, clear understanding of the range of error one can expect. Even though variables such as body mass, and position of the body have been cited as factors that could affect the cooling, no expert gave the jury any information on how much the change could be. For example, what is the difference between the adult rate versus a child's rate? Would it only be a small percentage difference? Merely telling the jury the various factors that *could* affect the rate does not provide them with enough useful information to critically evaluate Dr. Rasaiah's definitive opinion.

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<sup>67</sup> *Ibid* at 281, lines 20-25.

<sup>68</sup> 'Ante-mortem' and 'pre-mortem' means before death.

<sup>69</sup> *Ibid* at 282, lines 10-15.

<sup>70</sup> *Ibid* at 281, lines 1-5.

How would one critically evaluate Dr. Rasaiah's opinion? If the trial judge had been previously educated in forensic pathology in a CLE, or had access to the textbooks cited by counsel (both Crown and defence counsel cited forensic textbooks), he would have learned that deceased bodies do not cool at a constant rate. One line of questioning that would have helped understand the substance of the expert opinions is to seek the foundation of his opinion, that is, to elicit the reasoning or logic or evidence supporting the expert opinion. With respect to the rate of cooling, one can question the validity of the Moritz formula, which describes the falling of the body temperature in a linear fashion with time, given the complicated behaviour of cooling as shown in independent texts.<sup>71</sup> In general, a layperson with a high school mathematics education would recognize that the Moritz formula would be incorrect and insufficient in describing non-linear cooling behaviour.<sup>72</sup>

Another way that would assist in the critical assessment is to seek out any assumptions in an expert's opinion or theory. This is once again best accomplished with the help of independent texts in academic literature. It would have been useful to ask Dr. Rasaiah to identify the basis for his use of the rate of 1.5°F/hr. It is interesting that Spitz's textbook also explained the complexity of post-mortem cooling, including the non-linear rate of cooling. Indeed, the initial cooling rate suggested by Spitz was 2.0- 2.5°F/hr during the 'first hours' and an average rate of 1.5-2.0°F/hr in the first 12 hours.

Using information from Spitz, a judge could have tested Dr. Rasaiah on his assumptions. A judge could have asked Dr. Rasaiah to demonstrate that just by changing the rate of cooling by half a degree, that is, by taking 2.0°F, instead of 1.5°F, one would arrive at 8.2 hours as the number of hours since death, instead of Dr. Rasaiah's result of 11 hours! In other words, the time of death, using a rate of 2.0°F/hr, would give 11:48 p.m. as the time of death, not 9 p.m. as Dr. Rasaiah suggested. A half-degree difference in which rate you take as the denominator, even in Dr. Rasaiah's simple formula, gives a substantial difference in the resulting time of death estimate. Indeed, according to the Spitz text, the rate could have varied between 2.5 to 2.0°F/hr,<sup>73</sup> which means that it was conceivable that the

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<sup>71</sup> The complexity and low accuracy of the body cooling method was well explained in Spitz's text, Spitz, *Guidelines*, *supra* note 34 at 22-23. It is also well explained in Polson, *Essentials*, *supra* note 35 at 10.

<sup>72</sup> When an object cools in a non-linear fashion, it means that the rate of cooling is not constant over time. In a graph depicting the temperature of the object over time, the curve is thus not a simple straight line, ie. not 'linear'.

<sup>73</sup> Spitz, *Guidelines supra* note 34 at 22.

body could have been cooling at 2.5°F. Applying a rate of 2.5°F/hr would give a much later time of death. When a rate of 2.5°F is used, instead of Dr. Rasaiah's rate of 1.5°F, one would arrive at 6.5 hours as the number of hours since death, instead of 11 hours. The time of death, counting back 6.5 hours from 8 a.m. would take us to around 2 a.m. Therefore, even changing the cooling rate by as little as half to one degree can yield substantially different time of death results. A factfinder having access to this independent information on the range of cooling rates would recognize that Dr. Rasaiah had chosen one particular rate out of a range of choices. Understanding that this is a choice on the part of the expert leads one to ask the next question: what is the basis for such a choice, especially when these choices return such different time ranges for the time of death? The time of death evidence was crucial in supporting the Crown's exclusive opportunity theory. It was therefore important that this estimate was critically evaluated. In this case, such an approach would have demanded Dr. Rasaiah to explain his choice in using his formula in the face of uncertainty documented in textbooks to alert the jury to the possibility of confirmation or professional bias.

## F. Cause of Death

As in the time of death testimony, Dr. Rasaiah and Dr. Smith were confident in their opinions that Valin was murdered while being sexually assaulted. The physical evidence that they relied on to support the conclusion of asphyxia fall under three main categories:

- pinpoint bleeds (petechiae) on her eyelids, face, chest and shoulders and on the surfaces of the organs (heart, lungs, thymus)
- bruises on her lips, chest, on the left side of her neck.
- fluid accumulation and bleeding in the lungs, rupture of air sacs

Dr. Rasaiah testified that the external examination revealed a number of "injuries and it consisted first of all of pinpoint hemorrhages of the upper eyelids, the sides of the forehead, the centre of the chest, the upper part and front of the shoulder and the upper and front part of the left chest showed small pinpoint hemorrhages, and then in the centre of the chest there was 17 separate bruises over an area meshing 9 by 6 centimeters."<sup>74</sup>

When he was asked to explain what petechiae is, Dr. Rasaiah's teaching was as follows:

Q: And how sir, does that come about? How do these petechiae arise?

A: Because as a result of lack of oxygen. As a result of lack of oxygen.

Q: Lack of oxygen.

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<sup>74</sup> Trial Transcript, *supra* note 66 at 268, lines 5-10.

A: Yes, we use the term by asphyxia.

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Q: When somebody has a lack of oxygen these marks appear?

A: Yes.

Q: Where did you see those marks?

A: In the eyelids, the face, the shoulders front and the upper chest.

Q: And did that...what is the significance of that, sir?

A: It means that there's a lack of oxygen to the person. The person is not getting oxygen.

In addition, Dr. Rasaiah testified that he observed bruising in the mouth and lip area, and a hematoma (blood clot) on "the left side of the neck with bleeding around the thyroid gland."<sup>75</sup> He also observed some abnormalities in the lungs, such as hemorrhaging and fluid in the air spaces, as well as rupturing of the air spaces.<sup>76</sup>

Dr. Rasaiah concluded as follows:

A: Yes, the conclusion was that there was a mechanical obstruction either to the nose and mouth, neck or upper chest. The upper chest did show bruising and on reflecting the skin in the upper chest there was marked subcutaneous hemorrhaging. So these are areas where I felt there was some form of mechanical obstruction.<sup>77</sup>

Dr. Rasaiah further opined this could have been caused either by the nose and mouth being obstructed by "smothering, pressure, gagging" or by compression of the neck, such as 'manual strangulation, ... compression of the upper chest, pressure on the upper chest so that the rib cage cannot move in and out."<sup>78</sup>

In addition to performing the autopsy, Dr. Rasaiah had also ordered several lab tests. He found no evidence of natural cause:

First of all, sections were taken from all the tissues of the body and all the organs to look for underlying disease and I found nothing. And, secondly, I took culture studies, swabs were taken and tissue was submitted for culture for bacteria and viruses. Brain tissue and lung tissue were taken and they were cultured and they were all negative for bacteria and viruses.<sup>79</sup>

When Dr. Rasaiah was challenged on the inherent difficulty of distinguishing between post-mortem staining (livor mortis) and bruising he gave the example of a person who suffered from an assault on his face and who died afterwards. He explained that while bruises from the assault would

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<sup>75</sup> *Ibid* at 271, lines 25-30.

<sup>76</sup> *Ibid* at 272, lines 15-20.

<sup>77</sup> *Ibid* at 272 lines 20-25.

<sup>78</sup> *Ibid* at 272 lines 30-35; at 273 lines 1-10.

<sup>79</sup> *Ibid* at 291 lines 10-20.

overlap with post-mortem staining, histological sections would clearly allow one to distinguish the two.<sup>80</sup>

In addition to petechiae, Dr. Rasaiah also relied on the observation of a bruise on the neck as well as bruises on the lips to support the theory of asphyxia.<sup>81</sup> According to Dr. Rasaiah, bruises are always formed before death.<sup>82</sup> His teaching was that one can determine the age of bruises by the presence or absence of white blood cells. A ‘recent’ bruise, is one that was caused within 12 hours of death, “if there are red cells present and there’s no evidence of any white cells, significant number of white cells present in the tissue, then you will call that a recent bruise under 12 hours old.”<sup>83</sup>

Dr. Smith agreed with Dr. Rasaiah. Dr. Smith based his conclusion on several observations: petechiae on the surfaces of the organs in the chest (heart, lungs, thymus), the presence of fluid in the lungs<sup>84</sup> as well as petechiae in the eyelids and signs of injury to the neck.<sup>85</sup> Dr. Smith’s teaching was that specific findings of hemorrhage into the neck tissues and petechiae in the eyelids are “typical findings in an asphyxial mode of death”:

...petechial hemorrhages or the pinpoint, pinhead size hemorrhages I should say that are found on the surface of the organs in the chest, that is, the heart, the lungs, the thymus. And with that, there is congestion of the lungs and fluid accumulation in the lungs, or pulmonary edema which may be the term that you’ve heard. And so those are the ...those are the typical internal findings in an asphyxial mode of death.<sup>86</sup>

He was confident in his opinion that there was a “clear cause of death.”<sup>87</sup> He testified that “it is reasonable to assume that this death occurred as a result of a manual strangulation.”<sup>88</sup> He testified that “we’re dealing with an unnatural event with a physical event that somehow or other her oxygen supply to the tissues of her body and most noticeably the brain was interrupted.”<sup>89</sup>

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<sup>80</sup> *Ibid* at 357-358.

<sup>81</sup> *Ibid* at 271 lines 25-30.

<sup>82</sup> *Ibid* at 275 lines 1-5.

<sup>83</sup> *Ibid* at 278 lines 1-10.

<sup>84</sup> *Trial Transcript, supra* note 66 at 483:1-15.

<sup>85</sup> *Ibid* at 484 lines 1-10.

<sup>86</sup> *Ibid* at 483 lines 1-20.

<sup>87</sup> *Ibid* at 490 lines 1-10.

<sup>88</sup> *Ibid* at 485 lines 1-5.

<sup>89</sup> *Ibid* at 482 lines 25-35.



## G. How Independent Research Could Have Exposed the Unreliability of Crown Expert Evidence in Cause of Death Evidence

At first glance, the Crown's theory of manual asphyxiation seemed to have strong physical evidentiary support: the swelling of the organs, the bruises and pinpoint bleeds, the rupturing of the air sacs in the lungs. The jury was shown graphic photographs of Valin's body taken at autopsy. The many red and blue-tinged skin discolorations resembled bruises and signs of injury to a lay person. The Crown experts' conclusions sounded persuasive. They provided a positive, tangible, easy-to-understand cause of death. Furthermore, Dr. Rasaiah testified that he had over 20 years of experience in forensic pathology and performed over 4500 autopsies.<sup>90</sup> Dr. Smith's credentials are equally impressive. He was the director of the Ontario Pediatric Forensic Pathology Unit at the Hospital for Sick Children. He has been invited to give lectures on forensic pediatric pathology, including lectures to the Ministry of the Solicitor General.<sup>91</sup> Trial Crown counsel argued in closing argument that Dr. Rasaiah and Dr. Smith were not hired guns. Crown counsel said in his closing to the jury:

First of all, Doctor Rasaiah, well, how did Dr. Rasaiah get involved in this case? Did somebody call him in from some place?...No. Dr. Rasaiah is working at the hospital. He's a pathologist at the hospital, that's what he does. He's there, he's at the hospital. That's how he becomes involved, because he's there, and nobody has asked him about an opinion or anything else or called him in especially because he is directly involved.<sup>92</sup>

Fortunately, Mr. Mullins-Johnson had the benefit of Dr. Pollanen and other experts to submit rebuttal opinions in the appeal in 2007. However, the trial judge could have recognized the flaws of the Crown expert opinions, but only if he had learned about the state of existing forensic pathological knowledge on asphyxial deaths through some independent means, such as a continuing education course or conducted independent research. The following section details the existing research on the signs of asphyxia.

### *1. Does petechiae arise solely due to a lack of oxygen?*

Dr. Rasaiah's teaching on using petechiae as a specific sign of asphyxia was clearly contrary to existing knowledge on petechiae. It is noteworthy the Spitz textbook explicitly stated that the presence of pinpoint bleeding, often called 'Tardieu spots' was once erroneously thought to be indicative of

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<sup>90</sup> Trial Transcript, *supra* note 66 at 264, lines 15-30.

<sup>91</sup> *Ibid* at 477-478.

<sup>92</sup> Trial Transcript, *supra* note 66 at 786 at lines 25-35.

asphyxia. Spitz noted that it has since been shown that such pinpoint bleeds are not conclusive of suffocation, "...it has been shown that petechial hemorrhages are by no means conclusive evidence of death by suffocation...Pinpoint hemorrhages about the face and eyelids may also be found following cardiopulmonary resuscitation, independent of the mechanism of death."<sup>93</sup> With respect to strangulation Spitz noted as follows, "pinpoint and slightly larger hemorrhages are often noted in the face of a strangled victim, especially in the conjunctivae and eyelids. The presence of so-called Tardieu spots is supportive evidence of death by asphyxiation, but as a sole finding must not be considered conclusive." Even pinpoint bleeds that have similar appearances to Tardieu spots can be observed in the "reflected scalp" (scalp pulled back during autopsy) which are caused by the tearing of blood vessels during the separation of the scalp from the skull, hence has no probative value as to the cause of death.<sup>94</sup> The Polson text was also cautious of using petechiae as indicators of asphyxia. It noted that petechiae "may be seen in circumstances other than those of mechanical asphyxia."<sup>95</sup> Petechial hemorrhages found in other locations (pleura and pericardium) were no longer considered to be diagnostic of mechanical asphyxia. Although they should be considered to indicate a possibility of asphyxia, Polson cautioned, "Clearly the time has come to disregard these hemorrhages as diagnostic of mechanical asphyxia."<sup>96</sup>

## ***2. Does a body bruise after death?***

One compelling piece of evidence to support manual strangulation was the presence of the neck bruise. Dr. Rasaiah taught that all bruises are premortem<sup>97</sup> and the presence of a neck bruise supported the theory that Valin was strangled. Whether the bruises can only be premortem is significant. If one assumes bruises can only be caused during life, then that means that the bruise was likely caused just before death, making the theory of murder likely. However, if bruises can also be caused post-mortem, the bruise could have occurred when Valin's father performed CPR on her or caused during the autopsy procedure (i.e., artefacts).

The Polson text noted that bleeding and bruises can occur after death.<sup>98</sup> This was confirmed in a more recent studies.<sup>99</sup> Dissection artefacts have also

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<sup>93</sup> *Ibid* at 460.

<sup>94</sup> *Ibid* at 469.

<sup>95</sup> Polson, *Essentials*, *supra* note 35 at 354.

<sup>96</sup> *Ibid*.

<sup>97</sup> *Trial Transcript*, *supra* note 66 at 275, lines 1-5.

<sup>98</sup> Polson, *supra* note 35 p. 140.

<sup>99</sup> Dominick DiMaio and Vincent DiMaio. *Forensic Pathology*, 2<sup>nd</sup> edition, CRC Press, New York, 2001, p. 102. These authors stated that bruises can form after death. They

been documented much earlier in 1951 by Pinsloo and Gordon<sup>100</sup> who described how procedures performed during autopsy can give rise to what appears to be premortem bruising. In that study of 51 cases, the authors discovered that artefacts could not be distinguished from pre-mortem bruises by visual inspection or microscopic evaluation (histology examination).

In the Goudge Report, it was suggested that one of the factors a trial judge should consider was limitations in an expert's opinion, such as whether the method meets standards.<sup>101</sup> The effectiveness of this approach would depend on the objectivity, cooperativeness, and competence of the expert. This case study shows that one cannot rely on an expert to be fully objective.

Consider the following example. When Dr. Rasaiah was asked about the reliability of using the rate of body cooling to estimate the time of death, he testified that this was the standard method used. During his cross-examination, he said, 'We are using an approach that is used internationally by all pathologists.'<sup>102</sup> In fact, he remained steadfast in this position even in 2005, when the case was being reviewed again in preparation for the 2007 appeal. He responded that 'The criteria of temperature, rigor mortis and post-mortem lividity are used internationally and are in all textbooks including the Report Form of the Coroner's Act of the Province of Ontario, which we normally use to complete after post-mortem examinations.'<sup>103</sup> A better question might be to ask Dr. Rasaiah to name the specific sources he relied on, instead of accepting his testimony without question that his methods are used 'internationally.' However, even this question may draw a biased answer if the expert chose to reveal only sources that do use livor and rigor mortis or obtain out-of-date textbooks that support the use of these methods. For example, in his Response Letter in 2005, Dr. Rasaiah cited Prof. Knight from an *older* edition of Forensic Medicine, which supported the use of petechiae as markers of asphyxia, even though there

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cited an older study by I. Robertson (*J. Forensic Medicine* 1957; 4:2-10) which studied ante and post mortem bruises. N.E. Langlois and G.A. Gresham, "The ageing of bruises: A review of colour changes with time" *Forensic Science International*, 50 (1991) 227 – 238.

<sup>100</sup> I Pinsloo and I Gordon, "Post mortem dissection artefacts of the neck and their differentiation from ante-mortem bruises." (1951) 25 *S. Africa Med.J.* 358-361.

<sup>101</sup> Report of the Goudge Inquiry, Vol.3, at 495.

<sup>102</sup> *Trial Transcript*, *supra* note 66 at 330, lines 30-35.

<sup>103</sup> B. Rasaiah. Letter and Report, (September 19, 2005) (in Appeal Record for *R v Mullins-Johnson*, 2007 ONCA 720 (CanLII), 87 O.R. (3d) 425) 'Joint Record Vol.2. Pathologists' Reports and Correspondence (And Related Report of Dr. Zehr)' at 4.

were more recent editions in existence which taught that this was no longer held to be true.

Instead of relying on the expert to provide the court with information related to any limitations and weaknesses inherent in their opinion, a judge could have learned about the weaknesses by doing his own independent research. It can be seen in this case that the textbook by Spitz contained information that was contradictory to Dr. Rasaiah's testimony. Recall that the Spitz text contradicted Dr. Rasaiah's teaching of post-mortem body temperature cooling. The same text noted: "Under average conditions, the body cools at a rate of 2.0°F to 2.5°F per hour during the first few hours and slower thereafter, with an average loss of 1.5°F to 2°F during the first twelve hours, and 1°F for the next twelve to eighteen hours. Studies under controlled conditions have shown that the decrease in the post-mortem body temperature is not rectilinear but sigmoid in shape with a plateau at the beginning and at the end of the cooling process."<sup>104</sup> This information contradicted what was taught by Dr. Rasaiah, who assumed a cooling rate constant of 1.5°F/hr.

Had the judge performed independent research, he would have realized that existing scientific knowledge was contradictory to what Dr. Rasaiah taught. This information would have cast doubt on the reliability of Dr. Rasaiah's opinion. Ideally, it should be the cross-examining counsel who has caught these crucial sections. It is unclear why the trial defence counsel did not do this in this case. It could be that he was reluctant to do his own scientific research, and funding made it impossible for him to seek the help of a consulting expert. It could also be that the defence counsel himself was convinced that Crown experts must be correct in their diagnosis of asphyxia, who decided to strategically raise reasonable doubt by implicating Valin's father, Paul Johnson as a possible suspect, which led counsel away from further attempts at scrutinizing the science. As Justice Rosenberg said, if such information was not brought to the attention of the factfinder, the judge should 'prod lawyers' to ask the right questions.<sup>105</sup> The judge could have alerted counsel to such information so that it can be tested in open court.

Critical analysis demands evaluating whether there is a valid foundation supporting an opinion. It seeks a true understanding of the reasoning behind an expert's opinion, instead of accepting it without question. Dr. Rasaiah taught that rigor mortis begins to fade after 12 hours. Against this teaching, he concluded without explanation the time of death be 15-17 hours from the autopsy, which just happened to match the very time the

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<sup>104</sup> Spitz, *Guidelines supra* note 34 at 22.

<sup>105</sup> Report of Goudge Inquiry, *supra* note 4 at 239.

accused was alone with Valin. Furthermore, Dr. Rasaiah used the Moritz formula to arrive at a time of death of 9 p.m., with an error range of an hour before and after. This testimony would be highly probative towards guilt, *only if this two-hour estimate was reliable*. If the judge had access to the very textbook (Spitz) that Dr. Rasaiah admitted as authoritative, he would have learned that the rate of cooling could vary anywhere between 1.5 to 2.5°F /hour in the first 12 hours after death. The judge could have discovered that the time of death could vary by as much as 4.5 hours, just by being one degree off. As such a small difference in temperature could lead to such a different time estimate, the judge should have raised the issue of clarifying the basis for the use of 1.5°F.

In addition, the judge who had been independently educated that bodies do not cool at a linear rate, but rather, cool according to a complex non-linear curve, would have recognized the invalidity of using a formula that only applies if the body cools at a constant rate. According to the textbook by Spitz, 'Careful studies under controlled conditions have shown that the decrease in the post-mortem body temperature is not rectilinear but sigmoid in shape with a plateau at the beginning and at the end of the cooling process.'<sup>106</sup> As such, the cooling rate must necessarily change with time, rather than remain constant at 1.5°F/hour. Therefore, Dr. Rasaiah should have been asked to explain why he chose 1.5°F/hour as the rate, as there did not appear to be a way to discern which stage of the body cooling Valin's body was in at 8 a.m. It would have brought out to the jury's attention the lack of foundation for the use of the Moritz formula, which would only be applicable if the body truly cools at the same rate from the time of death to the time the rectal temperature was taken. A judge using an evidence-based approach and armed with the knowledge that the body cooling rate could take on values other than 1.5°F/hr (obtained from the independent textbook, Spitz), would have recognized that supportive evidence was missing in Dr. Rasaiah's definitive opinion that the time of death could be confined to a two-hour window. However, it is also important to note that this recognition could only have taken place after the judge had heard all rebuttal testimony, or if he had performed independent research. Thus, it is likely that any realization by the trial judge to raise these issues would only materialize towards the end of the trial process after expert testimony from both sides has been heard.

We see above that a trial judge certainly could have raised questions to flush out weaknesses or gaps in the Crown expert testimony. Even if defence

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<sup>106</sup> Spitz, *Guidelines supra* note 34 at 22. This was also in agreement with defence experts Dr. Ferris and Dr. Jaffe's teaching.

experts or defence counsel had not adduced evidence from sources of text that show that Crown expert knowledge was out of date or inaccurate, the trial judge should have introduced this into the trial process and allowed for both sides to respond with full opportunity. Ideally, in the common law process, it should be counsel who raises all the questions, both in direct and cross-examination. However, counsel may either strategically or inadvertently omit to raise all the questions, leaving crucial gaps of evidence that will lead to miscarriages of justice.

A judge who has done independent research would have probably caught the gaps. On the other hand, a judge who is not allowed to do this would have zero chance of catching these flaws. Judicial neutrality demands a full exploration and critical analysis of the facts and opinions raised by *both* sides of the litigation. Raising issues by a judge with any gaps in knowledge or contradictory information in pathology textbooks ensures a fuller fact record. In a jury trial, this should be done in the presence of the jury in an open court, so that all comments from the judge are subsequently reviewable on the record. Counsel should also be given time to respond and consult with their experts (adequate notice). Response to the issues raised by the judge will likely mean that experts have to be recalled to court. However, given today's technology in video conferencing, this is a minor inconvenience, and a small price to pay to avoid wrongful convictions.

## V. BALANCING INDEPENDENT JUDICIAL RESEARCH WITH JUDICIAL NEUTRALITY

The concept of an interventionist judge applying independently acquired scientific knowledge is perceived to be counter to judicial neutrality in the adversarial process. Firstly, as seen in *Bornyk 2015*, there are many reasons why judges should not introduce or apply independent research into the trial. Doing so erodes judicial impartiality by causing the judge to adopt multiple roles of being the witness, advocate and judge; raises the danger of the judge misapplying the specialized knowledge; deprives the parties of fair notice of what evidence the judge might uncover; removes control over what evidence is adduced by the party for strategic reasons (party prosecution). Secondly, aside from independent research, a judge in an adversarial process is limited to asking only clarifying questions directly to witnesses *during* their examination. This is to prevent judges from becoming an advocate in confronting or intimidating the witness.<sup>107</sup> A judge

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<sup>107</sup> Hamilton H. Hobgood. "When Should a Trial Judge Intervene to Question a Witness?" (1981) 3:1 Campbell Law Review at 74.

who has become inquisitorial has in effect caused the court to be composed of two opposing advocates against the expert witness, with no judge to rule on objections. For example, if the judge himself confronts the expert witness, the counsel who called the expert has no neutral referee to appeal to for objections.

Although there is a common perception that judicial passivity is the norm in the adversarial process, judges are not completely passive either. In motions, appeals and closing arguments at judge-only trials, judges routinely ask counsel challenging questions.<sup>108</sup> The purpose of this is to test out each party's position. Therefore, elements of active judicial participation are already present in the current system. In addition, appeal courts can appoint special commissioners, such as a trial judge, to investigate the facts, including the interviewing of witnesses.<sup>109</sup> Moreover, in the context of expert witnesses, the purpose of these questions is consistent with the role of the experts as impartial assistants to the court in understanding technical facts.

How should a trial judge intervene so that judges can competently engage in the substance of the expert evidence without sacrificing judicial neutrality? I propose that in cases of expert evidence, the judge should be allowed to review any materials from professional CLE courses. I would suggest that the judge ask questions *after* the examination of witnesses but *before* closing arguments. This way of proceeding preserves the traditional adversarial procedure, which is to allow the full opportunity for counsel to present their case and test out the opponent's case. It prevents the judge from taking over the role of opposing counsel during the examination phase. It is only where the judge recognizes that the trial process did not subject expert evidence to a robust critical analysis that guiding questions should be posed to counsel, subject to allowing counsel enough time to prepare a response, and recalling the experts where necessary. Expert evidence usually involves technical subject matter that often requires more time and effort in analysis than normal evidence from lay witnesses. A judge may not know what issues to raise until at least the expert examination is over. Therefore, a judge should ask clarifying questions before closing arguments.

Where the judge's concerns are triggered by independent research, he should name the source of the research, including any CLE materials he used as mentioned above. However, to be more cautious about the

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<sup>108</sup> The author thanks lawyers Monick Grenier and Mick Hassell for their insight on trial experience.

<sup>109</sup> Kent Roach. "Wrongful Convictions: Adversarial and Inquisitorial Themes" (2010) 35 *North Carolina Journal of International Law and Commercial Regulation*, at 428-430.

reliability of the source, he should have asked the experts to verify whether the source is authoritative. This sequence of proceeding, therefore, gives fair notice to counsel, giving them enough time to consult with their experts to return a properly considered and prepared answer to the judge's questions. It also allows counsel to craft their closing arguments, taking into consideration the judge's questions and any answers subsequently provided by experts.

When a judge frankly raises any issues arising from his own specialized knowledge, it allows for open and thorough testing in open court. It will expose any outdated learning, or mistaken understandings of the scientific concepts, *both* on the part of the judge and the experts. It also allows the parties' experts to correct any misunderstandings the judge may have from his independent research. For example, Justice Funt in *R v Boryk* (Part 3) noticed the prints did not match, a fact that supports the inference that the print from the crime scene did not belong to the accused. However, it may also be the case that the mismatch may be due to artifacts. It is known that even when the same finger makes two consecutive prints in a row, the two prints will not be completely identical. Therefore, Justice Funt should have raised his concerns so that the expert can be given a chance to address them. Asking an expert to explain is not necessarily a leading question, used by opposing counsel to undermine an opponent's witness. This is because the expert could potentially have a valid explanation for the mismatch. Asking the expert for an explanation means that the judge is seeking to fully understand and test the robustness of the expert's opinion.

As the Court of Appeal held in *Boran v Wenger*, 'We do not for a moment suggest that the trial judge has not the right-it may often be the duty- to obtain from witnesses evidence in addition to that brought by counsel-but this is adjectival, to clear up, to add to what counsel has brought out.'<sup>110</sup> Asking such questions satisfies the judge's duty to reduce any ambiguities in the testimony and to ensure the factfinder has enough information to perform a critical evaluation of the opinion. Such questions should be posed in the presence of both counsel and should be on the record. The purpose of these questions is to assist in the full understanding of the expert evidence, rather than simply undermining it. The answers to these questions should have the potential to not only expose the weaknesses, but also *strengthen* an expert's opinion. As such, they are not the leading questions which are asked with the sole purpose of undermining a witness.

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<sup>110</sup> *Boran v Wenger* [1942] DLR at 529.



In this paper, I argued that independent research by a judge is necessary to ensure accurate fact-finding and hence avoid wrongful convictions. Excerpts from current textbooks on pathology contradicted the knowledge base that was the foundation of the Crown experts' opinions. A trial judge could have easily accessed this information from the textbooks used by counsel. He could have raised questions about the foundation of the experts' opinions, which would have revealed the unreliability at trial. While this paper is based on a case study, it still provides many valuable lessons to be learned. It is hoped that this one case study will incentivize further research and debate about the passive versus inquisitorial nature of the role of the judge.

While experts retained by parties may always be biased to some extent, even if they were advised of their duty to the court, a judge is retained by the state, who must remain neutral. His goal is to ensure that objective truth is brought out at trial. In cases where the truth of what happened cannot be ascertained, this must result in an acquittal. Active engagement should thus be encouraged for a judge in understanding the substance of the opinion. He should be encouraged to ask for clarifying evidence which allows a full picture to emerge in cases where a judge recognizes that the factual record is incomplete. If such questions are not asked by opposing counsel, and the judge is muzzled from raising these questions that bring out the full picture, the jury will be left with a one-sided, distorted, and biased opinion, as was the case in the trial of Mr. Mullins-Johnson. When evidence required to evaluate the facts is missing, no one else in the courtroom, other than a judge has the power to ensure that this evidence is included.

The onus is on a judge to ensure a fair trial which leads to the right result. This has to be balanced against the equally important principle of judicial neutrality. A judge who realizes that gaps of fact exist caused either intentionally (counsel selectively presenting evidence) or inadvertently (counsel's inability in engaging with the technical content), fulfils his role of neutrality by asking questions to fill in any gaps in knowledge or bringing attention to any misinformation to be explained. Indeed, it is the judge who recognizes that there are gaps or misinformation led by experts, and who nevertheless *chooses* to allow the trial process to unfold in the name of passivity that does a disservice to the justice system. Ultimately, the judge has a duty to the public to ensure that all evidence, even scientific ones, is competently adjudicated. Only when cases are truly tried on the accurate substance can we have full confidence in our justice system.