

(v) Findings

Dr. Hillsdon-Smith made some errors during the initial autopsy. He conceded that this was so at the second trial.

The injuries identified after the exhumation bore some relevance to the defence, as did the fact that all bones located at the body site emanated from Christine Jessop. For example, the defence alleged that the extensiveness of the injuries identified after the exhumation demonstrated that the perpetrator spent a substantial period of time at the body site which, in turn, made it less likely that Guy Paul Morin (given his presence at the family home) was the killer. It is unnecessary to assess how significant this evidence was to the defence. It had been fully noted by the time of the second trial. Accordingly, the inadequacies of the first autopsy did not contribute to the wrongful conviction.

V. Systemic Evidence and Recommendations**(i) Overview**

I have found, *inter alia*, that:

- the hair and fibre comparisons properly understood, had little or no probative value in demonstrating Mr. Morin's guilt;
- the limitations upon scientific findings were not accurately or adequately communicated to police, prosecutors, the defence and to the Courts;
- □ scientific findings were overstated at times;
- original evidence was contaminated while in the possession of the CFS;
- the evidence of contamination was suppressed; it was not revealed to the police, prosecutors, the defence or to the courts;

- potentially exculpatory evidence was not drawn to the attention of the authorities;
- original evidence was lost;
- there was, at times, a loss of objectivity, inconsistent with the proper role of a forensic scientist;
- The CFS may have failed in its duties during the appellate process as well.

Dr. Young apologized to Guy Paul Morin for anything that CFS did to contribute to his wrongful conviction.⁴⁵ The contribution of the CFS to Mr. Morin's wrongful arrest, prosecution and conviction was, indeed, substantial.

Hair and/or fibre evidence:

- elevated Guy Paul Morin to prime suspect status;
- formed the justification, in large measure, for his arrest;
- formed the justification, in large measure, for the searches of his car and home;
- was cited by the Crown to support his detention pending trial;
- was cited by the Ontario Court of Appeal and Supreme Court of Canada as evidence relevant to their consideration of whether his acquittal should be overturned;
- formed a substantial part of the case against Guy Paul

⁴⁵ Of course, none of these findings are attributable in any way to Dr. Young, the present Assistant Deputy Solicitor General, Public Safety Division, whose responsibilities extend to the Centre.

Morin at his first and second trials;

- undoubtedly was relied upon by the jury to convict him at the second trial;
- up until the revelations at this Inquiry, was undoubtedly cited by some as support for the position that Guy Paul Morin was guilty, even after the DNA results were obtained.

I have no doubt that the public's confidence in the Centre of Forensic Sciences has been damaged by the revelations at this Inquiry. The evidence before me also demonstrates that the confidence that participants in the administration of criminal justice may have had in the Centre has been eroded. One senior Crown counsel, Steven Sheriff, said this:

I must say, this Inquiry has opened my eyes, and has quite frankly horrified me to realize how vulnerable we all are, Crown and defence, to the experts. We have no way of really being able to second-guess their testing, or even, quite frankly, to really understand its deficiencies, and to think that experts would not reveal to us significant data is really quite scary. I hope and trust this is isolated, but it really means that we, then, are the victims; we, Crown or defence, can become the victims of the experts.

.....

Well, we have to be wary now. We weren't wary before. We have to be wary now; our new directive represents progress on this regard. We have to make it crystal clear to the expert that we're not asking for anything more or less than the truth and objectivity, and it's a new day out there. We would be fools to take it for granted the way we used to. I'm still in shock; I mean, I look at all the cases over time when the experts were fully worthy of trust, and I've had so many of those, and this is real revelation to me.

But we've got to learn from experience, and we've got to be careful of this type of evidence. We haven't been traditionally in the past, and that's how we can be

victimized. So it's a new era.

Brian Gover, Crown counsel at the stay motion which preceded Mr. Morin's second trial, reflected this:

[A]s a prosecutor, I'd grown up with the notion of the infallibility of the Centre of Forensic Science.

.....

[I]n my view, clearly, the Centre did not deserve the confidence which the prosecution had placed in it in its analysis of the hair and fibre evidence in this case.

The Durham Regional Police Service Board commented as follows in its written submissions:

We submit that the damage that has been done to the good reputation of the Centre of Forensic Sciences cannot be overstated. It is not only the damage done in this case, but the subterranean effects of a general lack of confidence among the police community, prosecutors, defence bar, judiciary and the public at large which is so worrisome.

Everyone must be able to rely on the complete integrity, objectivity and accuracy of the Centre of Forensic Sciences if the Centre...is to be of any assistance whatsoever to the administration of justice. Not only must the Centre...do quality work but its credibility and reputation must be restored.

The Criminal Lawyers' Association articulated the greatest level of mistrust. This is what was said:

3. The contamination of evidence is a serious problem. It is however, a problem that could arise at any laboratory. If acknowledged, disclosed and remedied, a contamination problem would not call into question the competence and integrity of a laboratory. However, the failure to acknowledge, disclose and remedy the contamination very seriously calls into question both the competence and the integrity of the lab as a whole. The failure to act is evidence of the

lack of any effective system of quality assurance. The fact of contamination was generally known in the biology section of the Centre of Forensic Sciences for at least seven years before any remedial action was taken. That remedial action was taken not as a result of any internal system but as a result of an anonymous letter and outside pressure.

4. Overstatement of evidence is another serious problem. It is the most direct evidence of institutional bias. Again, however, if there has been timely acknowledgment of the problem and effective remedial action it might not call into question the integrity of the lab. That was not the case on the facts in Morin.

5. It might be submitted that the problem of contamination and therefore invalid scientific results arose only in the case of Mr. Morin and does not signal a greater systemic issue. However, the review of the work of Ms. Nyznyk and Mr. Erickson as part of the external audit [conducted during the Inquiry] revealed that “due to lack of documentation it was impossible to verify in some cases that the conclusions reached in the reports were accurate.” The problem of inadequate documentation identified in the evidence before the Commission was therefore further noted in the review as a cause for concern.

6. Similarly, the review found two further cases where “conclusions may have been stated incompletely, overstated, and/or stated without qualifications which may have led to the evidence being given greater weight than justified by today’s standards.” Aside from these two cases, there was another case by a different scientist in which evidence was admittedly overstated. This case was the subject of comment by Mr. Lucas in his evidence.

7. Nevertheless, the assumption made by the management of the Centre of Forensic Sciences is that there were no serious problems. The news release from the Ministry of the Solicitor General (Exhibit #192) reads as follows:

The findings of the review confirm that during the period of time in question, there were some systemic problems within the

Centre of Forensic Sciences's Biology section. Since then, a number of improvements have been made to ensure the province's forensic services are in accordance with the highest standards in the world.

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8. Therefore, the Centre of Forensic Sciences, although able to articulate the theory of quality assurance has not demonstrated an ability to put the theory into practice. Effective management must look for problems, must recognize them when found and must act immediately to remedy such problems. Remedial action in a competent, unbiased laboratory does not depend on outside pressure. Accountability is crucial to any system of quality assurance. The failure of the Centre of Forensic Sciences to disclose the contamination problem and to take any remedial action at the time makes it impossible for them to "demonstrate competence". Moreover, concerns as to competence arise on two levels: first, the scientific validity of the analytical results; secondly the overstatement of the conclusions.

9. The evidence of Mr. Lee Baig was that there exists a fundamental mistrust of the Centre by defence counsel. There is certainly a perception of bias. This attitude has historically stemmed in part from the Centre's policy of not conducting defence testing or offering opinions to the defence without requiring an undertaking to disclose to the Crown. However, the revelations of this Commission have deepened the mistrust and confirmed the suspicion of bias held by many defence counsel. It is submitted that every stage of analysis and interpretation of hair and fibre evidence in the Morin case was flawed. Virtually every flaw operated to the benefit of the prosecution and to the detriment of Guy Paul Morin. The wording of the findings with respect to the two other cases identified by the internal audit indicates that those "overstatements" also benefited the prosecution. It is unlikely that the defence bar would use the Centre more even if there were a policy of confidentiality. Absent significant systemic changes to address the issue of institutional bias, the validity of Centre of Forensic Sciences test results and interpretations must

remain suspect. (Citations omitted.)

The Centre of Forensic Sciences plays a vital role in the administration of criminal justice in Ontario. As the largest forensic laboratory in Ontario, it is called upon on a daily basis to assist in the investigation of serious crimes — not infrequently, the most serious crimes committed in this province. It cannot perform this role unless its scientists are objective, independent and accurate both in how they perform their forensic testing and in how they report upon their findings to police officers, prosecutors, defence counsel and the courts. Further, they must be perceived to be objective, independent and accurate by the participants in the criminal justice system.

I am confident that a large number of scientists at the Centre of Forensic Sciences perform their work with distinction. Any blemish upon the Centre — particularly a blemish of this magnitude — must be viewed by them with horror and frustration. However, I am equally confident that it would be a serious mistake to assume that the failings identified at this Inquiry are confined to two scientists in one criminal case. A number of the failings which I have identified have their root in systemic problems, many of which transcend even the Centre of Forensic Sciences and have been noted in cases worldwide where science has been misused — sometimes resulting in the conviction of the innocent. Further, Mr. Erickson was a section head at the Centre. Ms. Nyznyk was entrusted with many serious cases, including homicide cases. There is every reason to believe that their failings are not unique. Though I found no misconduct on Mr. Crocker's part, he acknowledged his own failings in addressing Roger Cook's evidence, when presented on the fresh evidence application. I earlier found that the Centre's response to a previous case where a hair and fibre analyst overstated his evidence was unimpressive.

Dr. Young candidly advised me that he had not realized the depth of the issues which had arisen at this Inquiry. This caused him, together with the Centre's present Director, Dr. Prime, to visit leading forensic institutions around the world in order to study their policies, procedures, training and quality assurance programs. The Centre has conducted an organizational review, studying its own structure, leadership, client and staff relationships and operations. One result has been that the Centre has embarked upon developing a comprehensive policy manual, updating existing policies and creating new policies where necessary. The Centre also retained independent experts to evaluate, *inter alia*, the findings in the *Morin* case. During the

course of this Inquiry I encouraged all parties to implement corrective measures to identified problems rather than await my Report. The Centre of Forensic Sciences has, to its credit, undertaken such measures — some in place, others proposed — to correct these problems. The creation of a separate quality assurance unit represents one example. A number of these measures are endorsed by me in this Report.

It is the position of the Centre of Forensic Sciences that its standards during the Morin prosecution accorded with generally accepted standards during that period. Subsequent changes, I was told, have reflected the evolution of standards in forensic sciences as a whole and that, with accreditation in 1993 and with further changes proposed or already initiated as a result of the revelations at this Inquiry, it is unlikely that the failings in the *Morin* case will be repeated again.

I, too, am hopeful that the Centre's corrective measures, together with those which I propose, will substantially reduce the likelihood that these failings will be repeated.

My recommendations draw upon the totality of the evidence heard during Phase II of the Inquiry, the systemic evidence bearing upon forensic issues and the submissions of all counsel. In that regard, I note the emphasis placed upon forensic issues in the excellent submissions on behalf of the Centre of Forensic Sciences, the Morins, AIDWYC, the Criminal Lawyers' Association, the Ontario Crown Attorneys' Association and the Canadian Bar Association — Ontario.

(ii) The Centre and the Ministry of the Solicitor General

Before reviewing the systemic evidence and moving on to the recommendations which follow, I wish to address one submission which arises out of any loss of confidence in the independence and impartiality of the Centre.

Several parties before the Inquiry have recommended that the CFS be removed from its place within the Ministry of the Solicitor General and be re-constituted as an independent agency. For example, the Canadian Bar Association — Ontario said this:

The Centre of Forensic Sciences is now part of the

Ministry of the Solicitor General and is funded by the Government. At a minimum, it has to be removed from a line Ministry role. To enhance independence, its budget should emanate from a central authority. This independent agency or board may have its own board of directors reporting directly to the legislature or be a non-profit Crown Corporation. Adequate funding is essential to its operation. Funding may be either from government or from a combination of government and private sources. With private sector involvement, scientific discoveries may be patentable and techniques developed for their sale. The CBAO recognizes that there are alternative models for independence. It is beyond the scope of this submission to determine which is the best model. Whatever choice is recommended by the Commission, or recommended for further study, the model should maximize independence, impartiality and accountability.

AIDWYC also urged this position upon me. Its submissions read, in part:

[T]here is a crisis of confidence in the work of the Centre and that the changes that have been undertaken by the Centre cannot ensure the objectivity and impartiality required of its scientists. This is particularly so when those responsible for its operations do not see systemic partiality as a problem. But rather, they believe, as does Dr. Young, that there is and always has been a culture of objectivity at the Centre. AIDWYC concedes that independence will not necessarily guarantee impartiality, however, if accompanied by other measures designed to promote impartiality and high quality scientific work, will go a great distance in helping build an environment where impartiality is an achievable goal.

The Criminal Lawyers' Association said this:

1. It is the position of the Criminal Lawyers' Association that based on the evidence before the Commission, the Centre of Forensic Science has such a deep rooted and fundamental institutional bias that any minor changes in procedure, documentation and training although advisable cannot be seen as addressing the real problems.

The Centre, through its representatives, has failed to acknowledge the real issues raised by the Morin case and has therefore not even begun to address those issues. It is the Criminal Lawyers' Association position that the Centre of Forensic Science as currently structured and managed is not capable of addressing these issues. There is an unacceptable lack of accountability at all levels of the Centre of Forensic Sciences.

The Criminal Lawyers' Association therefore recommends that the Centre of Forensic Science be re-structured as an independent agency or Crown corporation; that it be managed by a board of directors; that it provide forensic services on a fee for service basis to Crown and defence.

.....

The problem broadly identified as "institutional bias" in these submissions is illustrated by the response by the Centre to the problem of "overstating evidence." As indicated above, this problem was identified in two cases by the recent external audit. It was identified by Mr. Erickson with respect to Ms. Nyznyk's evidence at the first trial of Mr. Morin. It was identified by Mr. Crocker on the review of the evidence of Roger Cook in the appeal. It was identified by Mr. Lucas in another unrelated case. However, no Centre of Forensic Sciences employee has ever been disciplined for overstating evidence. No accountability exists in relation to this problem and no plans have been expressed to change the Centre of Forensic Sciences approach to this problem.

It is respectfully submitted that the depth of the attitudinal problems at the Centre of Forensic Sciences is so profound and the will to change so noticeably absent that only significant structural change to the entire organization can possibly change the philosophy, attitudes and biases of the Centre. Roger Cook in his evidence outlined the changes to the Forensic Sciences Services in Britain in order to create a "culture of independence". The agency was semi-privatized. It is now governed by a Board of Governors and performs work for both prosecution and defence on a fee for service basis. Similarly, in Australia steps

were taken to separate the lab from all police and prosecution functions. Part of that process involved a fee charging arrangement to make the agency financially independent of police or prosecution budgets. Dr. Tilstone in his evidence properly pointed out that independence does not necessarily import impartiality. He did however acknowledge the value of independence in addressing a deep mistrust on the part of one segment of the administration of justice (ie. the defence bar). He also suggested dialogue as being important to address the problem of actual or perceived bias. Absent any vehicle for dialogue or any reasonable belief that dialogue could address the problem Dr. Tilstone agreed that structural and financial independence might be the only option. It is submitted that no dialogue has even been attempted by the Centre of Forensic Sciences with the defence bar in over two decades. No concrete plans exist to change that situation. Therefore, the only viable option available to address the institutional bias of the Centre of Forensic Sciences and its lack of accountability to the public is to remove the Centre of Forensic Sciences from the control of the Ministry of the Solicitor-General and to create an independent agency.

RECOMMENDATION

That the Centre of Forensic Science be removed from the control of the Ministry of the Solicitor General. That an independent agency be created to run the Centre. That it be governed by a board of directors. That the Centre be run on a fee for service basis. After the necessary changes are made and set up costs are met, that portion of the Centre of Forensic Sciences budget attributable to police testing should be made available to the police to allow them to pay for scientific testing at the Centre of Forensic Sciences (or at any other laboratory). That portion of the Centre of Forensic Sciences budget attributable to defence testing should be made available to legal aid. All testing and opinions should be rendered to the defence on a wholly confidential basis. (The agency ought not to disclose to the Crown even the fact of a request by the defence).

In its written submissions, the Centre responded to these suggestions as follows:

The Criminal Lawyers' Association, along with various other parties before the Commission, have suggested that the CFS should become a Crown agency, separate from any government ministry, governed by an independent Board of Directors, and operating on a full cost-recovery or fee-for-service basis. The CFS rejects this suggestion, for several reasons.

Perhaps most importantly, the agency suggestion is based on two false premises. First, the CFS rejects the premise that institutional bias, attributable to its place in the Ministry, is currently present in the CFS. There is simply no evidence on the record before this Commission to support such a sweeping assertion. Second, even if there were such institutional bias at the CFS, there is no evidence to support the assertion that it would be remedied by transferring the CFS to Crown agency status.

The possibility of "agency" status was not canvassed with any witnesses before the Inquiry, including Dr. Young, who would have been particularly informed on the pragmatics of that subject. The only discussion of institutional structure was with Drs. Tilstone and Robertson, who spoke about the situation in Australia, which was described as a "political imperative", rather than a particularly logical one. Dr. Tilstone described how, following the Splatt Royal Commission, the forensic service in South Australia was removed from *the police*, in order to "prevent the police department controlling the [forensic] service by controlling the budget". This rationale is not applicable to the case of Ontario, since the police and forensic budgets and administrative structure are already entirely separate, other than the fact that both structures are ultimately responsible to the same Minister. Absent any concern about Ministerial interference (which is not the case here), there is no logical reason to complain about this nominal administrative connection between the two services. Further, and in any event, an agency would still report to the government, through a minister or a committee of Cabinet, and the same tenuous administrative connection would therefore remain.

It is submitted, therefore, that the real complaint in this case is not the institutional relationship between the police and the CFS, but the close working

relationship between the two. There is no reason to believe that this would be any different if the CFS were transferred to agency status. Drs. Tilstone and Robertson indicated that the police in Australia continue to be by far the largest consumer of forensic services, and this would no doubt be the case in Ontario as well.

The rationale for a cost-recovery or fee-for-service model is likewise highly questionable. As Dr. Tilstone clearly stated (emphasis added):

[T]he fiscal independence of commercialization is *exceedingly illusory*. In particular, the concept of commercialization and cross-charging fails to address the issue that commercial transactions only work where there's a clear understanding of the buyer, seller and goods triangle, and that this is not the case with forensic science, where the law, the prosecution service, the defence Bar, and the judiciary are all powerful stakeholders in addition to the police and the laboratory.

Underlying this comment is the recognition that the provision of forensic services is a critical aspect of the criminal justice system, that system being a core business of government. Accordingly, the CFS must be accountable to the public, and such accountability is best achieved when the service resides in government. Under the proposed structure, the funding for forensic services would ultimately still come from the government budget, only it would be funnelled to the consumers rather than to the CFS directly. There is a significant chance that this would result in overall costs being increased, as occurred in England. Further, the police would be in a position of deciding whether to perform certain tests based on cost considerations. In England, the cost of forensics in a single case caused the bankruptcy of a small police department. In an effort to cut costs other police departments in England have set up their own mini-labs to perform more "routine" tasks. Such laboratories are not accredited, and their handling of evidence increases the risk of deleterious change (such as contamination). In addition, there are dangers (1) that relevant tests

would not be done because of the costs involved, and (2) that small private sector laboratories would arise, providing competitive prices and causing fragmentation of various "pieces" of the forensic puzzle among a variety of service providers. All of these effects are directly contrary to the philosophy of the Campbell model, which is to enhance co-ordination through a scientific advisor with a detailed knowledge of all relevant forensic science issues.

For these very reasons, the concept of privatization of the CFS has been considered and rejected by the Management Board Secretariat⁴⁶ and by Mr. Justice Campbell in his 1997 Report. Mr. Justice Campbell stated: (Emphasis added.)

It should be noted however that any significant privatization of law enforcement DNA testing could have a potential negative effect on the use of DNA by law enforcement agencies and by the courts. Considerations against any significant degree of privatization include the potentially higher cost of testing itself; the cost to law enforcement agencies which might result in underuse of DNA testing capacity; privacy issues in relation to sensitive personal genetic material; the difficulties inherent in the potential splitting of a large series of single case samples between different labs; law enforcement confidentiality issues in the highly interactive work between police investigators and forensic scientists, and the difficulties for investigators and Crowns in working with an array of separate labs and scientists with varying degrees of expertise, court experience and credibility. **The same considerations of course apply to the privatization of forensic work other than DNA.**⁴⁷

⁴⁶ J.S. Ashman and J. Campbell, "Organization of Ontario Government Laboratories," February 1990; D. Balsillie, "Report of the 1993 Review of the Organization of Ontario Government Laboratories," March 1993. The Campbell Report also rejected privatization (at p. 73).

⁴⁷ Campbell Report, at p.73-74, emphasis added.

Where all costs are provided through "sales" to consumers, the focus on quality assurance would likely suffer if revenues fell short. Government funding, while perhaps available to some extent, would be more difficult to obtain where there is no direct link with a Ministry, and where there is a philosophy of complete cost recovery.

Finally, the CFS endorses Dr. Robertson's comments on the fallacy of structural "independence":

But frankly, structural issues are more about perceptions than they are about reality. The reality is that the real quality of the work which is produced is dependant upon the training and the competencies of the individuals. And if you produce someone who views themselves as a professional, you've got a much better chance, underpinned by professional values, you've got a much better chance that that person will perform as a professional within whatever organization they happen to be in.

The recommendations to the Commissioner, therefore, are misconceived in viewing agency status as a matter of primary importance. On the contrary, the goals of the parties can best be achieved by directing all efforts toward quality assurance and professional development.

The CFS had earlier submitted:

During the course of this Inquiry it was repeatedly suggested that the relationship between the CFS and the police is detrimental to the objectivity of CFS scientists. The premise is that the objectivity of scientists may be influenced by a close working relationship and by the fact that the two institutions reside in the same Ministry of government.⁴⁸ This is a premise which is rejected generally by forensic scientists, and by the CFS. As stated by Dr. Rodger,

⁴⁸ Note that unlike many forensic institutions, in Australia, Scotland and the United States for example, the CFS is not a laboratory which is part of a policing agency. Its position within government is separate from both the Crown and the police.

The function of the forensic scientist is to assist with the investigation of crime, which is carried out primarily by police officers. The forensic scientist, therefore, assists the police officers. To state that is in no way to state that the integrity of the forensic scientist is suspect.⁴⁹

It is submitted therefore that the institutional structure of the CFS needs no alteration. Rather, the issue is whether the CFS has taken all possible measures to foster objectivity and to identify a lack of objectivity if it occurs.

I agree with the CFS that it is unfortunate that this proposal was not specifically put by its advocates to Dr. Young when he testified before me. Accordingly, I do not have the benefit of his views in formulating my recommendations. That is why I have quoted the Centre's written submissions at some length.

The submissions advanced by the Criminal Lawyers' Association, AIDWYC and the Canadian Bar Association — Ontario represent the understandable concerns of some of the most important stakeholders in the justice system and they deserve careful consideration. However, having said that, I do not recommend, at present, that the CFS be removed from its place within the Ministry of the Solicitor General and be reconstituted as an independent agency. Though the Centre is accountable to the Ministry, the only evidence before me is that it is autonomous in terms of its day-to-day operations. The failings which I have identified in this case are unrelated to Ministry interference in the Centre's work. I am not persuaded that the failings would not have occurred had the Centre been an independent agency or a privatized corporation. To be blunt, the Centre has itself to blame. The Centre does not suggest otherwise.

I share most of the concerns expressed on behalf of the CFS. Whether it is an independent agency, a privatized entity or retains its present status, the vast majority of its work will be done at the request of the police. The Centre provides the forensic services relating to most of the criminal investigations

⁴⁹ W.J. Rodger, "Does Forensic Science Have A Future?," *Journal of Forensic Science*, November/December 1984.

in this province. Any defence need for forensic services is, in most instances, reactive to a criminal prosecution, and is generally confined to a relatively small percentage of the total number of criminal cases. Indeed, it is this ongoing and heavily weighted relationship between the police and the CFS (which would exist whatever the Centre's status) that raises concerns about partiality.

Since I am not convinced that removal of the Centre from its placement within the Ministry would have an appreciable effect on its impartiality, the real issue is the *appearance* of impartiality. Dr. Tilstone framed the issue well: independence does not guarantee impartiality; but it can assist in removing an entrenched and deeply rooted perception of bias or level of distrust which exists.

I am not yet persuaded that the changes already undertaken by the Centre, together with the implementation of the recommendations in this Report, will be unsuccessful in restoring the appearance of impartiality which has been so badly eroded. These changes are substantial; they involve greatly increased training, education, supervision, external and internal monitoring, the statutory creation of an advisory board and specific recommendations as to the manner in which examinations are conducted, and findings are reported to the police, prosecutors, the defence and to the Court. If the changes which follow this Report do not adequately address the depth of the Centre's failings (and the public's perception respecting them), the status of the Centre may have to be revisited.

(iii) Background Materials

In formulating my recommendations, I was assisted by a considerable body of forensic-related material collected by my staff (and made available to all counsel) or provided by various counsel for parties at the Inquiry. Several Royal Commissions or Inquiries, particularly in England and Australia, have addressed the misuse of science in criminal prosecutions. Many of their Reports have been provided to me. I wish to express my gratitude, in particular, to Assistant Commissioner Hadgkiss and Dr. Robertson, both of the Australian Federal Police, who enthusiastically provided us with resource materials from Australia, not easily accessible to us. Indeed, I was impressed with the encouragement offered to our Inquiry by all of the systemic witnesses, who attended voluntarily to assist us in our work.

(iv) United Kingdom

R. v. Ward⁵⁰

In 1973 and 1974, a series of bombs were set off in various parts of England, causing the death of 12 persons and injuries to many others. Judith Ward was accused, and ultimately convicted, of committing the crimes. She was sentenced to life imprisonment.

Ms. Ward did not appeal her conviction, but on September 17, 1991, the government referred her case to the Court of Appeal, Criminal Division. The appeal court quashed the convictions, finding that they were all unsafe.

The case against Ms. Ward was based largely (though not exclusively) on confessions and admissions made by her, and on scientific evidence to the effect that after two of the bombings, traces of nitroglycerine were found on her person, and that after the third bombing traces of nitroglycerine were found on various articles belonging to her and in a caravan in which she had been staying. The appeal court found that the confessions and admissions were unreliable. It also found, partly on the basis of fresh evidence, that the forensic scientists involved in the case had suppressed significant relevant information, overstated the forensic findings, and were biased in favour of the prosecution.

The Court of Appeal outlined numerous errors committed by the forensic scientists in the case. They are briefly referred to below and need not be detailed here. Of greater relevance are the Court's comments on the perceived neutrality of forensic scientists and the responsibilities which they bear.

Glidewell L.J. wrote:

In the appellant's case the disclosure of scientific evidence was woefully deficient. Three senior R.A.R.D.E. [Royal Armaments Research and Development Establishment] scientists took the law into their own hands, and concealed from the prosecution, the defence and the court matters which

⁵⁰ *R. v. Ward*, [1993] 1 W.L.R. 619 (C.A.).

might have changed the course of the trial. The catalogue of lamentable omissions included failures to reveal actual test results, the failure to reveal discrepant Rf values, the suppression of the boot polish experimental data, the misrepresentation of the first firing cell test results, the concealment of subsequent positive firing cell test results, economical witness statements calculated to obstruct inquiry by the defence, and, most important of all, oral evidence at the trial in the course of which senior R.A.R.D.E. scientists knowingly placed a false and distorted scientific picture before the jury. It is in our judgment also a necessary inference that the three senior R.A.R.D.E. forensic scientists acted in concert in withholding material evidence. Common sense suggests that none of them would have wanted a sudden revelation of the suppressed material at the trial. It is pointless to try to add up the number of failures which amount to material irregularities. It is sufficient to say that cumulatively the failures amount to a material irregularity which, on its own, would undoubtedly have required us to quash the appellant's conviction. The application of the proviso would have been out of the question. On the scientific case deployed against her the appellant did not have a fair trial. Our law does not tolerate a conviction to be secured by ambush.

For the future it is important to consider why the scientists acted as they did. For lawyers, jurors and judges a forensic scientist conjures up the image of a man in a white coat working in a laboratory, approaching his task with cold neutrality, and dedicated only to the pursuit of scientific truth. It is a sombre thought that the reality is sometimes different. Forensic scientists may become partisan. The very fact that the police seek their assistance may create a relationship between the police and the forensic scientists. And the adversarial character of the proceedings tend to promote this process. Forensic scientists employed by the government may come to see their function as helping the police. They may lose their objectivity. That is what must have happened in this case.

.....

What are the lessons to be learnt from this miscarriage of justice? The law is of necessity concerned with practical affairs, and it cannot effectively guard against all the failings of those who play a part in the criminal justice system. But that sombre realism does not relieve us, as judges, from persevering in the task to ensure that the law, practice and methods of trial should be developed so as to reduce the risk of conviction of the innocent to an absolute minimum. At the same time we are very much alive to the fact that, although the avoidance of the conviction of the innocent must unquestionably be the primary consideration, the public interest would not be served by a multiplicity of rules which merely impede effective law enforcement. Recognising that the Royal Commission on Criminal Justice will no doubt consider the subject of scientific evidence in criminal trials in depth, we propose to limit our observations about the lessons to be learnt to two matters which we regard as of critical importance.

First, we have identified the cause of the injustice done to the appellant on the scientific side of the case as stemming from the fact that the three senior forensic scientists at R.A.R.D.E. regarded their task as being to help the police. They became partisan. It is the clear duty of government forensic scientists to assist in a neutral and impartial way in criminal investigations. They must act in the cause of justice. That duty should be spelt out to all engaged or to be engaged in forensic services in the clearest terms. We trust that this judgment has assisted a little in that exercise.

Secondly, we believe that the surest way of preventing the misuse of scientific evidence is by ensuring there is a proper understanding of the nature and scope of the prosecution's duty of disclosure.

Roger Cook noted that this case caused 'tidal waves' in the forensic community.

The May Reports

On October 19, 1989, The Right Honourable Sir John May was appointed by the Home Secretary and Attorney General of the United

Kingdom to conduct a judicial inquiry into the convictions of 11 different persons who were to become known as the Guildford Four and the McGuire Seven. All of their convictions were ultimately quashed by the Court of Appeal, Criminal Division.

The charges against the Guildford Four arose out of a series of I.R.A. bombings which occurred in England in 1974 and 1975. The Guildford Four were convicted of causing explosions at two bars in Guildford on October 5, 1974. Two of the Four were later convicted of causing a third explosion at a bar in Woolwich on November 7, 1974. Seven people died in the explosions. The bars were known to be popular with members of the English armed forces.

The Guildford and Woolwich bombings were only three of a series of I.R.A. bombings. During the course of the police investigation into the other bombings, the McGuire Seven were arrested on charges of possessing explosives. The suspicion, of course, was that the Seven were involved in making the explosive devices used in the I.R.A. bombings.

Issues of scientific evidence arose in each case, although in very different ways. Sir John May investigated and reported on these issues. His findings, and the background circumstances which led to them, are summarized below.

The Guildford Four

The Guildford Four were largely convicted on the basis of confessions and admissions made by them. Scientific evidence played no part in the trials. Scientific evidence relevant to the trials did exist, however.

As indicated above, the Guildford and Woolwich bombings were part of a series of I.R.A. bombings. As part of the investigation into those bombings, scientists at the Royal Armament Research and Development Establishment (“RARDE”) examined the bombs to determine whether forensic links existed between them (something known as ‘correlation work’). Their findings indicated (cumulatively) that the Guildford and Woolwich bombs were linked to a number of the bombs used in other incidents. The importance of this finding was outlined by Sir John May:

The importance of the correlation work to those who

have campaigned on the Guildford Four's behalf is that they would interpret the work as meaning that all the bombings referred to were carried out by the same people. Hence since the bombings continued after the Guildford Four's arrest, the correlation work on this interpretation must indicate the Guildford Four's innocence.

The scientist's findings were reported in two statements, dated January 24, 1975 and October 10, 1975. The Guildford Four trial commenced in September, 1975, and thus one statement was prepared well before the start of the trial; the other was prepared during the course of the trial. Neither was disclosed to the defence until well after the trial (and subsequent appeal).

Sir John May found that it was understandable that Crown counsel lost sight of the possible significance of the January 24th statement, and therefore did not disclose it, since the Crown's interest in the work was in whether it linked the Guildford Four to the other bombings (which it did not). However, he also made the following findings:

On 24th January 1975 Mr. Douglas Higgs of RARDE made a witness statement linking the Woolwich bombing with other throw bomb incidents. That statement was not disclosed by the prosecution prior to the trial of the Guildford Four. It should have been. It was overlooked by all concerned. Counsel had it in their possession at the very beginning of their involvement in the case but by the time questions of disclosure were being considered by them they had lost sight of its potential significance. The staff of the [Director of Public Prosecution's] office should also have appreciated its continuing significance and sought Counsel's advice on disclosure. On 10th October 1975 Mr. Higgs made a statement linking the Guildford bombing with Woolwich and with many other bombings. This statement post dated the commencement of the trial and was not seen by Counsel until 1977. I have been unable to establish whether it was provided to the DPP before the trial ended. Had it been, it should have been disclosed. In any event, I have no doubt that these statements and the latter amended versions of them...should have been disclosed prior to the 1977 appeal irrespective of what had happened in the context of the trial.

The McGuire Seven

Unlike the Guildford Four trial, scientific evidence played a critical role in the trial of the McGuire Seven. In fact, the prosecution's evidence was almost entirely scientific. In a Report dated July 12, 1990, Sir John May found that the scientific evidence was unsound and the scientists involved in the case failed to disclose relevant information to either the prosecution or defence.

As indicated above, the McGuire Seven were accused and convicted of possessing explosives, nitroglycerine in particular. The police thoroughly searched the McGuires' home but found no evidence of any bulk quantity of nitroglycerine. The prosecution's case depended on scientific evidence of traces of nitroglycerine on the hands and gloves of the accused.

Seven thin layer chromatography tests were conducted on swabs of the accused's hands and scrapings from underneath their fingernails. Positive results were obtained for all accused except one (Annie McGuire), although a majority of the results were negative for three of them. With respect to Annie McGuire, a positive test result was obtained on her gloves.

The scientists at trial testified that the testing proved conclusively that the Seven had been handling nitroglycerine (as opposed to any other substance). One scientist further testified that finding nitroglycerine underneath the fingernails demonstrated that nitroglycerine had been handled or kneaded, rather than just touched. The defence countered that the TLC test used in the case was not specific for nitroglycerine, and could not prove its presence. It also contended that the evidence could not exclude the possibility of contamination, *i.e.* the presence of nitroglycerine other than by the known handling of it.

The defence at trial called an expert witness, Mr. Yallop, to substantiate their claims. In particular, he testified that substances other than nitroglycerine could mimic it and fool the TLC test. Sir John May found, however, that Yallop was effectively and successfully discredited in cross-examination.

Just before the trial judge's charge to the jury, Mr. Yallop found a memo from one of the principal scientific witnesses for the Crown (Mr. Elliot) which stated in effect that the TLC test could not easily discriminate between nitroglycerine and another explosive substance, pentaerythritol tetranitrate

(PETN). The memo was forwarded to the prosecution, but the RARDE scientists, particularly Mr. Higgs, assured the Crown that confusion between PETN and nitroglycerine was quite unlikely. The memo was ultimately filed on consent at trial, with the proviso that neither the defence nor the prosecution suggested that PETN was present on the accused's hands or gloves.

Sir John May found that the defence made this admission based on a fundamental mistake of fact. Notebooks and case files of the scientists involved in the case revealed that they knew throughout the trial that PETN was potentially confusable with nitroglycerine based on the TLC test used. These notes had not been disclosed prior to trial. Mr. Higgs testified at the trial that he had "a high level of confidence" that no other substance would be confused for nitroglycerine. He failed to mention PETN. He stated that such confusion was only a "vague possibility." Sir John May found that "[t]he failure to mention PETN at the trial was ... wholly misleading." He later added:

14.5 Secondly, to establish all the elements of the prosecution case the Crown relied on the evidence of the RARDE scientists. Their accuracy, reliability, fairness and credibility were fundamental to the convictions. The credibility of Mr. Yallop as a witness for the defendants was severely damaged in cross-examination, on the grounds that he had been selective in his evidence and had taken extraneous "non-scientific" factors into account in forming his conclusions. It is now clear to me that some at least of the RARDE scientists, notably Mr. Elliott who was the principal case officer concerned, did the same. If the jury had been aware of some of the contents of the notebooks which I have seen, particularly relating to the scientists' knowledge of but failure to disclose the existence of PETN and its mimicry of NG in the TLC/toluene tests, the fact of second tests themselves and the experiments carried out during the trial, I believe that they would have viewed the evidence of the RARDE scientists very differently. In his submissions to me Mr. O'Connor, acting on behalf of Mrs Conlon as the personal representative of Giuseppe Conlon, quoted passages from Sir Michael Havers' cross-examination of Mr. Yallop:

An expert witness such as yourself has the

obligation to be frank with the court ... not to be selective about his experiments ... not to pick the best and discard the worst ... not to select the ones that suit the case you were supporting and discard the one that casts doubt upon it ... You have not followed good scientific practice by disclosing all the tests; you have just been selective and picked out the one you wanted.

Had any of the counsel acting for the defendants at the trial had the material which I now have, he could have cross-examined the RARDE scientists effectively on precisely the same lines as did Sir Michael Havers challenge Mr. Yallop. In my opinion it has been shown that the whole scientific basis upon which the prosecution was founded was in truth so vitiated that on this basis alone the Court of Appeal should be invited to set aside the convictions.

After trial, it was also discovered that *a number* of other pieces of evidence had not been disclosed to the defence. For example, second tests of the hand and glove swabs had been conducted using a different type of TLC test. These second tests were negative. Sir John May found that these tests should have been disclosed.

Scientific studies were conducted for the purposes of the May Inquiry to determine the likelihood of contamination, as theorized by the defence at trial. These studies demonstrated that there was a substantially greater scope for innocent contamination of hands and gloves than the evidence of the Crown witnesses at trial suggested. In addition, an independent study was conducted after the trial by, among others, one of the RARDE witnesses at trial (Mr. Higgs), which showed that nitroglycerine can migrate under fingernails without the explosive being kneaded. In the absence of any evidence of a bulk quantity of nitroglycerine in the McGuires' house or nearby, the prosecution at trial had relied heavily upon the evidence that finding nitroglycerine underneath the fingernails demonstrated that nitroglycerine had been handled or kneaded. Mr. Higgs conceded before the May Inquiry that that conclusion could not safely be drawn.

All of this information was obviously not available to the witnesses at the time of trial, but Sir John May found that the RARDE scientists had actually conducted their own experiments relevant to the issue of

contamination, the results of which had been only partially disclosed:

11.20 Another serious omission revealed by the RARDE notebooks was that *during* the Maguire trial certain experiments were carried out at RARDE but the results were only partially disclosed. There were three sets of experiments.

i) Fingerprint ink

It appears from notes taken at the trial that Vincent Maguire in his evidence on 12th February 1976 said he had been fingerprinted before he was swabbed. The jury passed a note to the judge asking whether there would be any adverse effect on the swabs if fingerprints were taken before swabs. This was very properly picked up by the prosecution who clearly asked RARDE to do an experiment to enable the jury's question to be answered.

This was done by a Mrs Brooker, then a Scientific Officer at RARDE, who was called to give evidence on 19th February 1976. She said that she had carried out on 13th February TLC tests with fingerprint ink and NG [nitroglycerine] to establish whether the former could interfere with the performance of NG in the TLC test. She told the court that mixing fingerprint ink with NG produced a lower Rf value [*ie* affected the results].

ii) Fingernail scraping tests

According to Mr Gray's (junior counsel for Annie Maguire) notes of the trial, Annie Maguire gave evidence of in-patient treatment for her skin problem. Her hands had been very itchy and she kept scratching (although there was no current problem). This evidence was given on 8th February 1976. The next day Mr Yallop gave evidence on the possibility of migration by NG under the fingernails after no more than touching a contaminated object. Mr Higgs had already said in evidence on 27th January 1976 that he could not see how NG could be transferred under the fingernails after merely clenching the hand. Mr Elliot had maintained the assertion contained in his statement that NG under the fingernails indicated manipulating and kneading.

It was not until the RARDE notebooks were shown to the Inquiry that it was known that hand trials had also been conducted by Mrs Brooker on 11th February 1976 to investigate the presence of NG on the hands and under the nails after the fingertips and nails of one hand had been scratched on the other. The procedure was carried out on a person with long nails (Dr Carver, who has no current recollection of the experiment) and a person with short nails. The results indicated a faint trace of NG under Dr Carver's nails but nothing under the short fingernails.

Mr Higgs told the Inquiry that he was unaware at the time that the test had been carried out.

iii) "Sustac" heart tablets

On Wednesday 21st January Mr. Elliott gave evidence to the effect that when heart tablets containing NG were crushed on the hand a positive result for NG was obtained. But if the hands were left for a period of time no NG was detected.

Three weeks after this evidence was given there is a note in Mrs Brooker's notebook of a test carried out on the 12th February involving crushing one tablet in the left hand and three tablets in the right hand. Each hand was swabbed 3 ½ hours later and produced a positive result for NG. This result clearly conflicted with the evidence given earlier in the trial by Mr Elliott. As far as we can ascertain the results of the test were not made known.

Again Mr Higgs has no recollection of either how the tests came to be done or why the results were not disclosed. He did not learn the results of the test because he says he was not, during the trial, in contact with his staff at RARDE.

11.21 Both the question of contamination by heart tablets and the possibility that NG could be transferred under the fingernails after scratching were raised at the trial and were both important. As I would have expected, prosecution counsel told me that had they been made aware of the tests they would have ensured that the results were made available to the defence. It seems to me clear that the results were not

communicated by RARDE to the prosecution despite the fact that the experiments were carried out on three consecutive days a week before the person who conducted them gave evidence. While I accept that it was not Mrs Brooker's responsibility to convey the results of her tests, it is to say the least strange that no one at RARDE saw fit to tell at least the office of the Director Public Prosecutions of the two further tests Mrs Brooker had done. She can only have been asked to do them by a senior scientist at RARDE and one who knew what questions were being raised at trial. As Mr Elliott has died since the trial and thus I heard no evidence from him, I am not able to identify who this senior scientist was. Whoever he may have been, however, it should have been apparent to him that prosecuting counsel ought to have been told of all three further tests.

Sir John May ultimately concluded that innocent contamination was a possible explanation for the findings which could not be safely excluded.

Sir John May held further hearings with respect to the McGuire Seven after the release of his first Report. Further scientific studies were also commissioned with respect to the issue of contamination. Based upon these studies, Sir John May concluded in a second Report (dated December 3, 1992) that the positive test results from the swab samples obtained from the accused could have resulted from accidental contamination of the samples after they were obtained; that finding nitroglycerine underneath the fingernails did not *prove* that the explosive had been handled; and that the fingernail findings could have resulted from cross-contamination during the taking of the McGuire samples (without any fault on the sampler's part).

The Runciman Report

On March 14, 1991, the Royal Commission on Criminal Justice, chaired by Viscount Runciman, was established by the Government of the United Kingdom. On the same day, the Court of Appeal had quashed the convictions of the six men convicted of the 1974 bombings of public houses in Birmingham (the 'Birmingham Six'). The government announced that the Birmingham Six case, along with many others (including the Guildford Four and the McGuire Seven), had raised issues of general concern. The Commission was accordingly appointed, not to inquire into particular cases,

but rather to review the criminal justice process in England and Wales as a whole.

One of the issues that the Royal Commission was directed to examine was “the role of experts in criminal proceedings, their responsibilities to the court, prosecution, and defence, and the relationship between the forensic science services and the police.” In doing so, the Commission made a number of recommendations designed to improve the delivery of competent independent forensic services. The relevant portions of these recommendations are referred to in the context of specific recommendations which I have made below.

(v) Australia

In an article entitled “Misapplied Science: Unreliability in Scientific Test Evidence,”⁵¹ author Judy Bourke addresses the issue of unreliable scientific evidence in Australia. She examines the findings of several Commissions of Inquiry into wrongful convictions in the context of her thesis that scientific evidence is frequently misused in criminal trials because it is often unreliable, yet shielded from scrutiny by an ever present aura of scientific certainty. An excerpt from her article is reproduced below. The excerpt is rather lengthy, but necessary in order to understand the circumstances of the wrongful convictions under examination. Reference should be had to the original Inquiry Reports for a complete outline of the findings of the Commissions and the facts of the cases.

“My God, My God. The dingo’s got my baby.”

Mrs. Chamberlain, 17 August 1980

[The scientist] says it is foetal blood, and I suggest to you that she ought to know ... because you know really, if the suggestions made about their work in this court have any substance, people in New South Wales are in constant danger of being wrongly convicted when ever there’s some blood involved, and it’s really, I suggest, rather too ridiculous to contemplate that [the scientist] would come

⁵¹ Parts I and II, (1993) 10 Aust. Bar Rev. 123.

into this, in the course of her daily work, as a professional forensic biologist, and muck it all up not knowing whether she was dealing with adult blood or the blood of a child under three months of age.

Prosecutor at the Chamberlain trial, October, 1982

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Mrs. Chamberlain's spontaneous tragic utterance was not accepted at her trial for the murder of her nine week old daughter. Scientific evidence from various fields was found to prove a circumstantial case of homicide. The judicial appeal process by the Chamberlains effectively affirmed faith in the reliability of the scientific evidence which had been relied upon. Mrs. Chamberlain spent three and a half years in jail before the *1987 Commission of Inquiry into Chamberlain Convictions* (the *Morling Report*) cast serious doubts on the reliability of the scientific evidence.

There are two views of the Chamberlain case. Many scientists and many lawyers believe the *Chamberlain* case is an aberration within the Australian legal system. This marginalisation is in no small part due to the media sensationalism which has always surrounded the *Chamberlain* case.

The other view, that of a small minority of scientists and an even smaller number of lawyers, believes the *Chamberlain* case is merely indicative of a more extensive problem. That is, the unreliability of scientific evidence unjustly affects many criminal trials where such evidence is used to prove crucial circumstantial facts. They see the problem compounded by a legal community which, along with the general population, unquestionably accept scientific test results and opinions based on such results. And the frequent misuse of scientific test evidence, in the words of the highly respected Mr. Winneke QC, has reached "urgent proportions".

This paper supports the second view. I will argue that scientific test evidence is frequently misused in criminal trials because of its unreliability. The heart of

the problem lies in the fact that those charged with presenting and trying the facts of a trial, whether judge, jury, counsel or solicitor, are unable to assess the accuracy of the test results. This is attributable to the aura of scientific certainty which creates a shield of accurate objectivity around scientific test evidence. The legal process, in admitting and utilizing scientific tests evidence, is neither directly concerned with its accuracy nor the implied assumption of certainty it carries. Scientific evidence cannot be relevant unless it is accurate, no matter how much it purports to be concerned with the issue before the court. And scientific test evidence, regardless of its accuracy, is not critically assessed within the system to avoid over-emphasis or over-reliance being placed on it as a piece of merely circumstantial evidence.

This paper will argue that there is a separate problem of *reliability* of scientific test evidence. Such evidence cannot be considered solely in terms of admissibility; it differs to other forms of identification evidence which may be considered unreliable, such as eye-witness evidence. The subject matter, the concepts, and the language, preclude an assumption that ordinary laypersons have the experience to evaluate the reliability of scientific test evidence, either as to its accuracy, or to compensate for their inherent bias. With the growth in science and technology now occurring, the need to find effective solutions to this problem is immediate.

The first part presents a series of Australian case studies as the basis of the three aspects of the problem: the existence of unreliable scientific test evidence; its extent across a range of scientific tests, whether old established techniques or novel ones; and the lack of awareness of the problem by lawyers. Anecdotal evidence from interviews with members of the legal and scientific communities supplements the facts detailed. The second part briefly examines the law as it currently applies to scientific evidence, placing the unreliability problem in context. This provides the basis for the third part which synthesises the material presented, and outlines solutions to effectively address the problem of unreliable scientific test evidence.

Within this framework, the approach taken in this

paper is necessarily broad: it does not present a critique of the unreliability of a particular case, test or field of science. It does not take issue with the presentation of scientific test evidence within the adversary system. Furthermore, the findings do not purport to be of statistical value. Rather, it is a preliminary study, clearly demonstrating the existence of a problem confronting the legal system which is conceivably of significant magnitude. It is worth noting that the problem is not confined to Australia — the *Birmingham Six* case in England, the *Thomas* case in New Zealand, and the *Castro* case in the United States of America all attest to the larger problem facing the adversarial system at the end of the twentieth century. However, for the purposes of this paper, case studies and interviews were confined to the Australian criminal legal system.

I — The Evidence

Introductory Comments

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Scientific Dimensions

There are two dimensions to the use of scientific test evidence which jointly contribute to the unreliability problem. First, scientific tests may be unreliable because they are scientifically *inaccurate*. Secondly, scientific tests, irrespective of the accuracy, may be unreliable because an *aura* of science surrounds the scientific evidence in illusory certainty.

The first dimension, scientific inaccuracy, is a real and significant aspect of the problem. While errors do not occur with every test, its potential should not be overlooked as minimal. There are three levels of scientific testing which must concern the lawyer when considering the accuracy of scientific test evidence. The first is the reliability of the underlying scientific principles, secondly, the reliability of the scientific process and its execution, and thirdly, the reliability of the interpretation.

Lawyers must refrain from concluding, when ignorant of scientific philosophy, principles, and

processes, that scientific malpractice is the cause of any problem. Inaccuracy may result from procedural flaws and less than ideal sample quality. Inaccuracy may be caused by poor application of scientific principles, using preliminary tests to express firm conclusions. Inaccuracy may also result from procedural flaws, which are in no part due to poor sample quality.

The second dimension, the aura of scientific certainty, causes lawyers and jurors to operate under a shroud of assumed omnipotence of science. This precludes both a critical assessment of the accuracy of test results, and also precludes a critical weighting of the scientific evidence amongst the totality of the evidence, regardless of its accuracy. Twentieth century dependence on science and technology, without an understanding for basic scientific principles, has created an aura of scientific certainty which pervades the whole of society, and no less lawyers.

The aura of scientific certainty has an overall impact which cannot be defined further. However, two specific examples emerge from the case studies, both concerned with the interpretation of test results. One is that observed facts are expressed as ‘consistent with’ the hypothesis the accused is guilty; the other is the statistical presentation of observed facts.

Legal Dimensions

The two legal dimensions of the problem of unreliable scientific test evidence are, first, that lawyers are generally unaware of the *existence* of a problem, and secondly, the *extent* of the problem encompasses all scientific tests.

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The Chamberlain case

On 29 October 1982 Mrs. Chamberlain was convicted in the Supreme Court of the Northern Territory of the murder of her nine week old daughter, and sentenced to life imprisonment. She was released from prison nearly three and a half years later...On the basis of further evidence before the [Morling] Inquiry which

was not presented at the trial, the *Morling Report* concluded 'that there are serious doubts and questions as to the Chamberlains' guilt and as to the evidence in the trial leading to their convictions'.

This case study only examines the blood tests in the *Chamberlain* case. Although other scientific evidence was also found to be unreliable by the *Morling Report*, the conclusions as to the blood tests were significant to the final recommendation. The blood tests of stains in the Chamberlains' car, and articles found in it, were crucial to the prosecution's case, because this was asserted to be the scene of the murder. The blood tests indicated not only the presence of blood, but also that it was foetal blood as distinct from adult blood. The ortho-tolidine test supposedly proved the presence of blood, and the cross-over electrophoresis technique that it was foetal blood.

The ortho-tolidine test

The ortho-tolidine test is a preliminary, or screening, test to detect the presence or absence of blood. It is a preliminary test because it can give a positive reaction to substances other than blood and is therefore not totally specific to blood. It is a simply executed test used as an aid to forensic scientists to suggest if further blood tests should be carried out. The results of an ortho-tolidine test should not be used to give conclusive opinions that blood exists in a certain sample.

Deficiencies to the ortho-tolidine test include its lack of specificity and its acute sensitivity to blood. The non-specificity of the test was demonstrated at the Morling Inquiry: Mount Isa dust reacts positively to the ortho-tolidine test because of the presence of copper compounds in the air at Mount Isa. The Chamberlains lived at Mount Isa before and after the death of their daughter. Its acute sensitivity to blood was also shown: it will react to such small amounts of blood as may be scattered by a normal sneeze. As the intensity of the reaction does not depend on the volume of blood it is not safe to estimate a volume unless it can be seen. The *Morling Report* concluded:

the ortho-tolidine results obtained from [the

samples taken from the car] did not establish the presence of blood. Even if the reactions observed were the product of blood, it could have been such a small amount that its presence there would not justify the drawing of any inference adverse to the Chamberlains.

The cross-over electrophoresis test

Some of the 'blood' samples taken from the car were subjected to further testing to identify them as foetal blood, on the assumption that it was blood. The cross-over electrophoresis technique was used and at the trial said to confirm the presence of foetal blood. The *Morling Report* doubted the reliance placed on the cross-over electrophoresis results on three grounds. First, the tests lacks specificity to foetal blood; secondly, there was an inherent problem with the samples taken from the car; and, thirdly, the procedure itself gave cause for concern.

First, the cross-over electrophoresis test lacked specificity to foetal blood. However, another test, the Ouchterlony test, is specific, and can confirm the presence of foetal blood. The Ouchterlony test was not used in the *Chamberlain* case.

Secondly, the results of the cross-over electrophoresis tests were unreliable because of the denaturing effect of heat and time on exposed blood. The samples tested were not taken from the Chamberlains' car until at least 13 months after Azaria's disappearance. During that time, the Chamberlains had use of their car in Mount Isa where the interior of the car could feasibly have reached 80c on several days. The *Morling Report* summed it up as:

the age of any blood in the car and the temperatures to which it had been exposed ... raises doubts as to the reliability of [the] immuno-chemical results and, in particular, those depending upon the use of the anti-foetal haemoglobin anti-serum.

Thirdly, the procedure used for the cross-over electrophoresis testing can be faulted in several ways. With respect to the so-called 'arterial spray' the

Morling Report said:

The fact that she could come to such a conclusion about something which was, very probably, sound deadener casts doubt upon the accuracy of her other results.

The first procedural fault was to use the anti-sera reagent 'straight off the shelf' as if it were designed for routine laboratory use. At the Inquiry the scientist agreed that this created flaws, and agreed that 'on this basis, approximately one-third of those results would have been worthless'. Secondly, the use of 'controls' in the test procedure varied greatly. Tests run on known substances and of known dilutions are controls. As the *Morling Report* states 'the known blood of Azaria found on her clothing would have been a much more satisfactory control and would have afforded more confidence in the results.'

A third procedural flaw was the estimation of the dilution of the 'blood' samples by visually comparing the red colour with the known dilution of a control. Scientists at the Inquiry disputed the original method used, although they could not agree if the samples were significantly over-diluted or significantly over-concentrated. Either way it affected the accuracy of the results obtained, and was avoidable. The fourth procedural fault was that only the scientists' notebook was kept as a record of results — the test plates were thrown out, and no photographs were taken of them. The interpretation of these tests is relatively subjective which casts doubt on the results when no visible evidence of the tests was retained.

The Splatt case

On 3 December 1977 an elderly woman was brutally strangled in her Adelaide home. There were no witnesses. Within a year Mr Splatt was convicted of her murder. Splatt was released from prison after the 1984 *Royal Commission Report concerning the conviction of Edward Charles Splatt* (the *Shannon Report*) found reasonable doubt as to the validity of the scientific evidence.

The prosecution's case relied on the cumulative

effect of similarities of trace materials between the crime scene and the home and working environment of Splatt. Scientific tests were conducted to detect the presence and relative proportions of trace materials such as seed particles, paint particles, human hair, cotton fibres and wool fibres. The first two of these typify the reliability problems in the evidence which the *Shannon Report* revealed.

Seed Particles

Splatt was linked to the crime scene by the presence of seed fragments on the victim's bed, the accused's clothing and the accused's car. There was an aviary in Splatt's backyard. First, all the fragments were 'confirmed' as seeds by their positive reaction to Iodine and Sudan IV, which respectfully identify starch and oil. Secondly, scientists stated at the trial that the seed fragments on the bed were (a) of the type found in a bird seed mix purchased by the botanist, and (b) contained most of the same seed types as found in the aviary. Both observations implicated Splatt at the trial as the carrier of the seed particles to the crime scene. Thirdly, the seed fragments on the bed were allegedly uncooked, and therefore not from biscuits, bread or toasted muesli, because the starch grains had not lost their bipolarised character, a scientifically determinable feature.

The *Shannon Report* found the reliability of such scientific tests dubious in three ways. First, the Iodine and Sudan IV tests are preliminary: they do not identify samples beyond being starchy or oily. These tests cannot confirm that particles originate from botanical seed. Therefore, it is assumed, not proved, that the particles were botanical. Secondly, the comparisons between the type of seed grains at the crime scene and those in connection with Splatt were a search for similarities. They merely confirmed the hypothesis that Splatt was guilty; they did nothing to try to exclude him. Thirdly, bipolarisation in starch grains does not confirm prior heating: starch grains do not necessarily lose their bipolarisation on the application of heat, and there are other means by which starch grains can lose their bipolarisation. Thus the grains may have been cooked and thus not been bird seed.

Paint particles

The presence and ratio of metal-to-paint fragments, and the ratio of orange-to-any-other colour in the paint particles was probably the most important scientific evidence linking Splatt to the crime scene. Samples were compared from the crime scene with samples from Splatt's clothes, car and workplace. Splatt worked as the spray painter in a factory across the road from the victim's house.

The trace materials were collected by tape liftings, sweepings and vacuuming. Microscopic examination indicated metal-to-paint fragments existed in a 25:75 ratio in samples from the crime scene, and the clothes, car and work environment of Splatt. Scientific analysis by solvents and electron microprobe produced results that orange paint was present in these samples in ratios of close to 90:10 with respect to any other colour. This analysis also showed that the various colours of paint particles from the crime scene matched the colours of paint particles from Splatt's workplace. Electron microprobe analysis of the metal particles produced a table of results from which it was concluded that the material from the crime scene was consistent with that from Splatt's workplace.

Vaseline coated slides were left at the crime scene for an extended period of time to test the extent of wind blown particles that arrived there. The particles found on the slides were smaller than those found at the crime scene. The trial evidence was that the paint and metal particles at the crime scene were too big to have been blown from the factory.

A neighbouring factory which used the same brand of paint did not have 90% orange paint particles on the floor. Splatt's co-employees were not suspects because all but one had the inverse metal-to-paint ratio of 75:25. The exception was Splatt's son who lived at home and whose clothes were washed with Splatt's. The son's ratio was 50:50. The Locard principle of transfer was explained at the trial as the transference of trace materials from one object to another on contact. It accounted for the transference of trace materials to the crime scene, supposedly from Splatt, and for the difference in the ratio of the son's clothing,

supposedly 75:25. It was described as ‘one of the basic principles of modern forensic science’.

The *Shannon Report* found each aspect of this evidence to be unreliable. The vaseline coated slides incorrectly excluded ‘windblown’ as a source of paint and metal fragments at the crime scene. The evidence of experts in atmospheric physics, meteorology and aeronautical engineering, combined with the results of various experiments, demonstrated the complexity of airborne particulate matter: size alone is not the determinant. The metal-to-paint ratios lose their significance if the crime scene and other sources are affected by wind blown fragments. Furthermore, the appearance of precision in the ratios was deceiving because the electron microscope analysis is only semi-quantitative.

Transfer of particles under the Locard principle was supported by visual examination only. And the Locard principle was applied selectively: it explained the alleged change in Splatt’s son’s ratio after washing, but no attention was given to the static ratio of Splatt’s clothes after washing.

The Rendell case

Mr Rendell was convicted of the murder of Yvonne Kendal in 1980, at the Supreme Court of Dubbo in New South Wales. Rendell was sentenced to life imprisonment. After serving over seven years in prison, Rendell was released. Then, pursuant to s 475 of the Crimes Act 1900 (NSW), an Inquiry was conducted into the guilt of Rendell (the *Hunt Report*). On 23 June 1989, Mr. Justice Hunt recommended that Mr Rendell be granted a pardon.

Ms Kendal died instantly on 30 July 1979 of a gunshot wound. Rendell owned the rifle which discharged, killing Kendal. Rendell did not dispute that there was physical contact with Kendal immediately prior to the rifle discharging. He maintained that he did not know how the rifle discharged. There were no witnesses. The Crown relied on circumstantial to infer Rendell’s intention. Three of the five salient circumstantial issues involved scientific evidence. The Crown alleged that a guilty

conscience of the accused could be implied from, first, the blood stains around the basin in the bathroom, and secondly, the lack of fingerprints on the rifle, both being attempts by Rendell to destroy the evidence.

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Blood tests to establish the presence of blood around the basin were conducted. At the Inquiry, the scientist ‘acknowledged...the sample of what appeared to be blood on the wash basin was no more than only probably blood and that she was unable to say whether it was human or animal blood’. The *Hunt Report* concluded that virtually no weight should be attached to this evidence.

Fingerprints were taken by a detective and subsequently by the forensic scientist. The latter results were used to corroborate the earlier fingerprint tests. However, the scientist ‘failed to take into account the other tests which the rifle had undergone before she carried out her own tests’. This is a clear affront to basic scientific principles and contributed significantly to the *Hunt Report’s* conclusion that the evidence for the Crown was unreliable.

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III — The Synthesis

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A — Practical Considerations

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Unreliability in scientific principle

The use of preliminary tests to draw positive conclusions occurred in the tests for the presence of blood in *Chamberlain* and *Rendell*, in tests for the detection of foetal blood in *Chamberlain*, and in *Splatt* with respect to the bipolarisation analysis and seed identification. It appears that uncritical attitudes to scientific test evidence has permitted recurrent use of preliminary tests in evidence.

Preliminary tests should only be used to guide scientists in the direction of further testing. The use of such results in evidence in court should be minimal. Even accompanied by statements that the test is non-conclusive will not remove the aura of scientific accuracy that surrounds scientific tests. Scientists sometimes do not know the specificity limits to the tests they use. Lawyers need to be aware not only to challenge an expert's credentials and expertise, but also to seek independent expert advice to gauge the reliability of tests results.

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Unreliability in scientific interpretation

(a) Patterns of similarities

Patterns of similarities to establish a common origin occurred in each of the five case studies. The entire prosecution case in *Splatt* employed this method...The same effect also occurs from the use of preliminary tests, as in *Chamberlain and Rendell*, where the results do not disprove the accused's guilt; they are merely consistent with it.

Scientific testing 'should be a search for dissimilarities, not for similarities'. It is a scientific principle that tests be 'designed to disprove the original assumption' of the accused's guilt, that is, to exclude the suspect. The risk in testing for a pattern of similarities is that it implies the assumption of guilt is correct. This strengthens the implication of the common origin of crime scene samples to the suspect. The *Shannon Report* referred to this risk of heightened assumption and stronger implication as 'unconscious bias'.

The risk in asserting results are similar or consistent is in the effect it creates on the minds of the jury, counsel and judges. 'No dissimilarities' or 'not inconsistent with' are effectively the same as 'similar to' or 'consistent with'. The scientific connotation in these expressions is limited, but a jury cannot be 'expected [to] be attuned to the scientific nuances'.

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B — Theoretical Considerations

Each level of scientific testing must be scientifically accurate. It may be argued that one legally unreliable fact, in conjunction with other facts which support the expert's opinion, does not invalidate the opinion. This seems implausible. The reliability of the final test result must be endangered if one of a multiplicity of factors on which the opinion is based is unreliable.

The general lack of recognition of the problem is because both aspects of the scientific dimension are intertwined: potential inaccuracy and the aura of such evidence. This is further complicated by the anomaly that a jury of laymen is expected 'to resolve a dispute between experts on a subject about which they know nothing other than what the experts have told them'. This paper does not take issue with the jury system. But a jury cannot be expected to assess the reliability of scientific test evidence or, at least, not without an explanation of the relevant scientific principles and processes involved.

A Solicitor General for South Australia, JJ Doyle QC, could not have expressed the point more erroneously: 'The adversarial system adjudicates upon the respective merits of cases. The scientist is concerned with absolute truth or fact'. The law must come to terms with the nature of science and scientific evidence: scientific testing operates by attempting to disprove a hypothesis, not prove it, so that a hypothesis will be accepted until another explanation destroys it. Scientific interpretation relies on statistical probabilities because no test actually and finally proves the hypothesis. The scientists may strive for absolute truth or fact, but results are never proved conclusively. It is imperative that lawyers understand the scientific method so that scientific evidence is used in the law not *because* it is science, but because the principles and processes are *reliable* to the satisfaction of the law.

C — Solutions

While proposed changes to the rules of evidence have so far reflected the opinion that problems of forensic evidence are concerned with admissibility, I argue that

this is a misguided approach. The problem of unreliability is endemically embedded in legal misconceptions. Only direct legal education will address the problem at its source. Reforms to the scientific community and the trial process must also be considered to improve standards of accuracy of tests and to account for the reality of the aura of scientific certainty.

Education of Lawyers

Education of lawyers to the existence of the problem of unreliable scientific evidence, and their own lack of awareness, is the most direct solution. To be effective, it must be directed at all levels of the legal profession.

The aim of legal education on this issue ought to be to destroy the aura of scientific reliability and address the legal misconception of science. It is not suggested that lawyers be educated on the intricacies of each and every test: that is impractical and unnecessary. The education content should provide an introduction to scientific concepts and a reference point for further inquiry, much as legal education provides its undergraduates.

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Methods of education

Educational programs need to reach as many lawyers involved in the criminal process as possible. The issue should be a component of the undergraduate law degree subject of Evidence, and a variety of seminars, conferences and short training courses made available to groups of barristers, Legal Aid Commission solicitors, and barristers and solicitors for the Crown.

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Scientific reforms

Scientific standards

Establishing scientific standards is a major reform which requires serious attention to alleviate the problem of unreliable scientific test evidence. The urgent need to legislate for scientific standards is

apparent to many forensic scientists. Cost factors are frequently cited as an objection, but this argument lacks full comprehension of the range of reforms.

The major features of reform to scientific standards are:

- □ national standardisation of test procedures,
- □ national data bases for all relevant Australian test procedures,
- □ accreditation of laboratories,
- □ independent forensic science institutes.

(Citations omitted.)

I note that Ms. Bourke pointed out that some saw the *Chamberlain* case as an aberration, a view with which she disagreed. Indeed, it appears to be a common theme of proven miscarriages of justice that they often are regarded as ‘aberrations.’ The Centre, in its written submissions, characterized the *Morin* case as an ‘aberration.’ Others, too, expressed this opinion. In my view, given the findings which I have made in this Report, and their resonance with similar findings and systemic issues in cases worldwide, it would not only be dangerous, but also inaccurate, to characterize the Morin case as an aberration.

(vi) Panel of Wrongfully Convicted

During Phase VI of the Inquiry, AIDWYC organized a panel of persons who had been wrongfully convicted of serious crimes. Their evidence touched numerous issues, ranging from the use of specific types of evidence in their convictions, to the impact that this tragic situation has had on their lives, and the lives of their families.

Their evidence, and the evidence of experts who testified generally as to the causes of wrongful convictions (including the misuse of science) are fully elaborated upon in a later chapter.

(vii) *R. v. Roberts*

I was provided with a number of court decisions bearing upon the use of science in criminal prosecutions and, more particularly, the role that hair and fibre evidence has played, or should play, in such prosecutions. Several are referred to in the context of specific recommendations, but it is opportune

to comment on one of them, *R. v. Roberts*,⁵² since it has more general relevance to the Centre of Forensic Sciences.

Mr. Roberts was convicted of the murder of a woman who lived in an apartment directly beneath his own. Loose human hair was found on the body of the deceased and on her bed and nightshirt. This hair was compared to that of Mr. Roberts. Mr. Dieter VonGemmingen, an analyst with the CFS, was called by the Crown to testify to the results. In all, Mr. VonGemmingen determined that 26 of the hairs found on and around the deceased were similar to Mr. Roberts' hair.

No expert evidence was called at the trial to dispute or question the reliability of these findings. Crown counsel and the trial judge considered this evidence to be important and significant. The Crown spent a great deal of time on it in his closing address. The trial judge referred to Mr. VonGemmingen's evidence as being "of extreme importance in this case."

Mr. VonGemmingen testified at the trial that he could not say with certainty that the hairs had come from a particular individual's head, but he could say from his analysis that the hairs were similar to one another, and that if they were mixed up he could not then distinguish one from the other. He also testified as follows:

Q. Well, when you establish similarity what are you basically establishing, if you agree with me, is that there could be maybe even a strong possibility the hairs come from the same source?

A. That's correct. My understanding of similarities is one step short of positively saying that it came from one particular person.

Q. Right. So you can say 'similarity' and you can talk in terms of possibilities because you have no mathematical and statistical figures at your disposal you may not speak in terms of probabilities, is that correct?

A. I think I can speak in probabilities with respect to experience and with respect to my opinion, yes.

⁵² (1977), 34 C.C.C. (2d) 177 (Ont. C.A.).

Q. Just before I leave you, I want this clear in my mind that when you think about these similar characteristics and you give an opinion based on your experience that there is a strong possibility the hairs came from the same source, speaking now of the unknown hairs and the sample hairs from Roberts?

A. Yes.

Q. Yes, you mean to say as a possibility that you are not armed with any probabilities for me in terms of mathematical reference?

A. Not with mathematical reference. All I can say it is highly probable.

Q. Yes, all right, what you are trusting is this scientific intuition that you have developed over the last 13 years, your ability to look at this unbelievably complicated distribution of pigmentation granules, and make some sense out of it?

A. Oh yes, you can. You see this is the beauty of the comparison microscope. You have the one in question and one known hair. When you have them lined up, when you see these pigmentation granules carry over from one-half of the hair to the other half, when they are so similar and so the same *then you must come to the conclusion that this is the same source.* (Emphasis added.)

Mr. Roberts appealed his conviction to the Court of Appeal for Ontario. The Court considered fresh evidence, including that of Dr. Robert Jervis, who testified that the differences in concentration of the trace elements in the hair found on the deceased's body (said by Mr. VonGemmingen to be similar to Mr. Roberts' hair), and hair strands known to have come from Roberts' head, were such as to make it "very unlikely" that the hair was, in fact, hair from the appellant. The Court allowed the appeal, concluding as follows:

Taken in the context of the whole evidence, including the fact that the appellant testified, and in view of the importance, understandably, placed on VonGemmingen's evidence, this new evidence, in my opinion, is of sufficient strength that it might

reasonably affect the verdict of the jury. It may be that the Crown at the new trial will be able to discredit or diminish the effect of this new evidence. That will be for the jury to determine.

A second trial was held and Mr. Roberts was acquitted.

Mr. Lucas was asked about the *Roberts* case in his testimony before the Commission. He accepted that the case was one where a hair examiner at the CFS asserted an opinion well beyond that which he was entitled to give.

In March, 1978, Mr. Lucas wrote an article in the Crown's Newsletter about the *Roberts* case. This is what he wrote, in part:

At the original trial in Kitchener, the examiner stated his findings and quite properly expressed his conclusion during direct examination. During a very lengthy and complex cross-examination, he reiterated this conclusion several times; however, at one point he did state that to him, "similar" meant "one step short of certainty". In this statement he erred since hairs do not permit this sort of a statement to be made.

Mr. Lucas denied that he was trying to defend the CFS. He acknowledged, however, that the purpose of the article was to suggest that the evidence given to contradict Mr. VonGemmingen was based on a technique which the CFS and other labs had rejected. Counsel for the Morins alleged that this reflected a lack of objectivity on Mr. Lucas' part:

Q. And, I'm going to suggest to you, sir, that in essence, your article is really an example of bias, if you will, that is perhaps reflected, a lack of objectivity, that is being reflected in your views of the Morin case.

That, when you reviewed the Roberts case, a conviction of a man who was subsequently found innocent, spent years in jail prior to that, in fact, twice as long as Mr. Morin, as it happens, your reaction, sir, as a forensic scientist and a member of the Centre of Forensic Sciences, out of which the questioned evidence came, is not to try and find out what's wrong with the institution and the people within it from whence the evidence came. But is rather to try and defend the institution and its employees. Do you agree,

sir?

A. No, sir.

Q. You don't. You don't think that perhaps a more appropriate way to react to the problem that arose in the Roberts case, and what was said in the Roberts case, was first of all to quote your expert correctly? And to examine how things could go so wrong, that a man could spend three years in jail as a consequence of what one of your people said?

A. I think I did quote him correctly in the quote that I used. That certainly is my recollection of it. I don't recall the other portion that you read, or I certainly would have quoted that. Obviously, I overlooked it or didn't see it.

Q. And you don't this, sir, that your article might have been better addressed to the problem of a man having spent three years in jail as a consequence of one of the people who worked at the Centre?

A. You mean an article directed to Crown attorneys? I don't think so.

Mr. VonGemmingen did not suffer serious repercussions for his actions in the *Roberts* case; Mr. Lucas could only confirm that VonGemmingen was verbally admonished, although he thought that the punishment went beyond that, but could not say for certain. He could not recall any instance of someone being dismissed from the CFS for overstating evidence or improper analysis.

(viii) Crown Policy Manual

By letter dated November 14, 1997, the Acting Deputy Attorney General provided me with two new Crown policies, one relating to jailhouse informants and one relating to physical scientific evidence. She noted that these policies were intended to address the issues raised at the *Morin* criminal proceedings and at this Inquiry. She also reflected that "these and all other Crown policies will be reviewed in light of your final recommendations."

The Crown Policy on Physical Scientific Evidence was jointly prepared

and adopted by the Ministry of the Attorney General and the Ministry of the Solicitor General and Correctional Services. (See *Crown Policy - Physical Scientific Evidence, dated November 13, 1997, Appendix K.*) It does indeed specifically respond to a number of the issues raised at this Inquiry. The Ministries are to be commended for this policy. Subject to several comments made in the context of specific recommendations, I endorse much of the policy's contents. In particular, the policy articulates well:

- the obligation of full disclosure of scientists' reports, underlying documentation, tests or other material which the defence believes is relevant to making full answer and defence;
- the duty of Crown counsel, upon defence request, to support access to forensic scientists (retained by the Crown or consulted by the police) and to advise scientists of the necessity of providing the defence with appropriate documentary access;
- the duty of Crown counsel to disclose information potentially impeaching defence experts;
- the appropriate relationship between Crown counsel and forensic scientists. I quote:

It is the clear duty of government scientists to assist in a neutral and impartial way in criminal investigations. They must act in the cause of justice. (See the decision of the English Court of Appeal in *R. v. Ward*, [1993] 1 W.L.R. 619. See also D.M. Lucas, "The Ethical Responsibilities of the Forensic Scientist: Exploring the Limits" (1989), 34 *J. of Forensic Science* 719).

The necessity for including in the report any information adverse to the Crown is a matter of educating those who prepare scientific or other expert reports. *The Crown should advise all experts that they are not to take an adversarial position, but are to provide the Crown with the results of any tests or information which, arguably, may*

assist the accused, so that the Crown may make proper disclosure, even though the person preparing the report considers that the results of the test or other information is irrelevant” (page 233-4 Martin Committee Report). Government scientists will be aware of this duty via this policy. Non-government scientists should have this duty brought to their attention, perhaps by including a copy of this policy with the letter of retainer. The information which ought to be provided in the report includes information about all tests conducted by the forensic laboratory in connection with or relevant to the case, including those with inconclusive or negative results. It does not necessarily include generally available background scientific information or opinion relevant to or used in interpreting the results of testing.

In the normal course scientists employed in government sponsored forensic laboratories are exposed more frequently to police investigators and to Crown counsel than to the representatives of the defence. Indeed, the function of the forensic scientist is in part to assist in the investigation of crime which is carried out primarily by police officers. The forensic scientist, therefore, assists police officers. (See Roger, “Does Forensic Science Have a Future”, J. For. Sci. Soc. (1984) 543.) Investigators must necessarily provide background information arising from their investigation in submitting articles for testing so that forensic scientists can determine the most effective and appropriate scientific approach to possible evidence. This gives the scientist a measure of autonomy in the making of investigative decisions, but also exposes the scientist to the police theory of the case. Finally, where the results of the scientific investigation inculcate the suspect, the scientist becomes a necessary witness for the prosecution and will be exposed to, and be part of, the development of the Crown’s case. All of this is, of course, entirely proper and does not mean that the integrity of the scientists is suspect.

However, because forensic scientists working in government-operated laboratories are more familiar with police and prosecution personnel and with

prosecutorial approaches and concerns, *there may be a tendency for them to feel 'aligned' with the Crown. In some jurisdictions this understandable relationship between the prosecution and forensic scientists has resulted in a perception on the part of the scientists that their function was to support the police theory. Such a perception is wrong and has the potential to contribute to a miscarriage of justice.*

Forensic scientists are subject to their own rule of ethics which require impartiality ... While it is not the Crown's or the scientist's function to supervise or control the professionalism of the other, the purpose of this joint policy is to reinforce the necessity of a clear and impartial presentation of the evidence to the court. This will protect the integrity of the role of government scientists and ensure that their evidence is available with all its legitimate force in the criminal process.

In seeking information and advice from forensic scientists, this policy emphasizes that Crowns are seeking a candid opinion. Candor is necessary in order to assist the Crown in exercising its prosecutorial discretion and in preparing its case for trial. The value of early case conferencing is highlighted by Mr. Justice Archie Campbell in his 1996 *Bernardo Investigation Review*. Participation in case conferencing where possible will provide Crown counsel with the opportunity to clarify issues and establish an appropriate relationship with forensic scientists. *Where possible it is preferable that a police officer be present to take notes of any meetings with the forensic expert and those notes should be disclosed to all parties;* (Emphasis added.)

- the way in which forensic scientific evidence should be presented at trial.⁵³ I quote:

Scientific evidence should be presented in such a way that everyone involved (witness, counsel, judge, jury) understands the evidence and its relationship to the issues in the case. In cases tried by a jury this is particularly challenging for counsel.

⁵³ I have recommended below that the policy that a scientist's concern about misleading evidence should be communicated to the officer-in-charge be modified.

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The presentation of difficult scientific evidence can be greatly enhanced by the use of visual aids (overhead slides, computer projections, charts, demonstrations, videotaped tours of facilities). *It could be dangerous to use a visual aid in court without first reviewing it with the scientist to ensure that it accurately conveys the true force and effect of the evidence.* If it is proposed that such aids are to be used to make scientific evidence more understandable to the jury, their use should first be canvassed with the judge out of the presence of the jury, and most often in a pre-trial conference or motion prior to the selection of the jury. Where such aids are used they should be properly exhibited and thereby entered into the record. If aids include audiovisual presentations (overhead projection or slides) Crown counsel should endeavour to preserve the record by attempting to have representative portions of such material exhibited, and, where appropriate, making observations on the record.

The objective of the Crown must always be to see that the expert's opinion is presented to the jury with nothing more or less than its legitimate force and effect. It is important to ensure that experts understand that, if at the end of their testimony they are concerned that a misleading impression of their evidence has been left with the triers of fact, they should relay that concern to the officer-in-charge as soon as possible. The information given to the officer by the scientist triggers an immediate disclosure obligation to the defence. Counsel should be aware that scientists from the Centre of Forensic Science are alive to this obligation.

In presenting expert evidence it is, of course, important to remember that many scientific fields use technical jargon which has a different connotation in normal parlance. *It is important then that counsel presenting scientific evidence to a jury take care to ensure that the expert's opinion is expressed in terms which permit the jury to either appreciate the significance of such technical jargon, or that these terms are appropriately translated to less idiosyncratic terms;* (Emphasis added.)

- the continuing obligation of the Crown to disclose information or evidence of a forensic nature relevant to an outstanding appeal.

(ix) Systemic Expert Witnesses

During the systemic phase of the Inquiry, I heard, *inter alia*, from a panel of pre-eminent forensic scientists, each nominated as a witness by AIDWYC, the Morins or the Centre of Forensic Sciences. Counsel for these parties worked together in presenting these panellists' views in a non-adversarial way. Many of their views coincided; all were of great assistance to me. I also heard from Dr. Young, who outlined the remedial actions taken at the Centre since the Morin prosecution. These actions were intended to address not only those concerns arising out of this Inquiry, but also the recommendations previously made by Mr. Justice Campbell in the *Bernardo Investigation Review*. I find it more convenient to summarize the evidence of these and other witnesses in the context of my specific recommendations. However, I briefly highlight their biographies at this point.

Dr. Edward Blake is an American forensic scientist who specializes in DNA work. In 1976, he received his doctorate in criminology (forensic science) from the University of California, Berkeley. He has worked as a consultant in forensic biology since 1975. He has published a number of papers on DNA and related topics. He was a member of a team of scientists (agreed upon by all parties) who conducted the DNA tests which resulted in the exoneration of Guy Paul Morin and David Milgaard. He has been involved in 15-20 post-conviction wrongful convictions cases in the United States and Canada. He also noted that, in many cases, his DNA testing has incriminated the accused or confirmed guilt.

Dr. James Robertson has been the Director of Forensic Services, an agency of the Australian Federal Police, since 1989. He was a Lecturer in the Forensic Science Unit of the University of Strathclyde for nine years, and then became a senior forensic scientist with State Forensic Science of the State Service Department of South Australia. He specialized in the examination of trace evidence, especially hair and fibres, and in the examination of Cannabis plants and prepared products. He has published a number of articles on forensic science, including hair and fibre analysis.

Dr. William Tilstone is the Executive Director of the National Forensic

Science Technology Centre in St. Petersburg, Florida. He is also a Courtesy Professor in forensic science at the University of Central Florida. He received his Ph.D. from the University of Glasgow in 1968, and was for many years a Lecturer and (subsequently) Professor of Forensic Science at the University of Strathclyde. In 1984, he became the Director of Forensic Science for the Government of South Australia. He was appointed to his current position in 1996. Dr. Tilstone is a pharmacologist, a serologist, and one of the forensic scientists who first introduced DNA technology in Australia. He has published about 120 papers in forensic science, and has acted as forensic consultant to governments around the world. He is also a member of the ASCLD accreditation board.

Dr. James Young is the Chief Coroner for the Province of Ontario and the Assistant Deputy Solicitor General, Public Safety Division, in Ontario. He is also an Associate Professor in the Department of Pathology at the University of Toronto. He received his Doctor of Medicine in 1975, and worked at the Penetanguishene General Hospital for several years until he became Regional Coroner for the Metropolitan Toronto and Central Region in 1982. He has written and lectured extensively, and presided over a number of Coroner's Inquests.

(x) An Overview of Accreditation and Quality Control

The American Society of Crime Laboratory Directors (ASCLD)'s Guidelines for Forensic Laboratory Management Practices, 1986, define quality assurance as "a system of activities the purpose of which is to provide to the producer and users of a product or service the assurance that it meets defined standards of quality with a stated level of confidence." The Centre's written submissions make clear that the 'cornerstone' of the Centre's quality assurance program is the accreditation program administered by ASCLD's Laboratory Accreditation Board (ASCLD/LAB). ASCLD is a professional organization comprised of crime laboratory directors. Its accreditation program is a voluntary program for crime laboratories to ensure that they meet set standards. The Centre first received accreditation in 1993 and will seek re-accreditation this year.

The Centre outlined the accreditation process in some detail:

The program includes a comprehensive set of principles and specific standards, each of which is

assigned a rating of "essential", "important" or "desirable". To achieve accreditation, a laboratory must be inspected by a group of ASCLD/LAB trained inspectors, who must find that the laboratory meets 100 percent of the essential criteria, 70 percent of important criteria, and 50 percent of desirable criteria. Over time, many criteria have changed from desirable, to important, to essential, with the mandatory standards evolving to become more stringent. In 1993, the CFS obtained a score of 100 percent in essential, 100 percent on important, and 90 percent on desirable criteria.

The process of achieving accreditation starts with a preparatory period, during which a laboratory must review and, if necessary, align its existing practices and policies to comply with ASCLD/LAB requirements. This is followed by a written application, and then an in-depth on-site inspection by an ASCLD/LAB team whose function is to assess fairly and objectively all criteria which apply to the applicant laboratory. None of the criteria are negotiable. In the case of the last CFS accreditation, the team was comprised of six people, who together had expert knowledge in the various disciplines of each section of the CFS. Each inspector was required to have come from an accredited laboratory, to have successfully completed the ASCLD/LAB inspector training course, and to have been certified by the Board. The inspection occupied a full working week, during which time the inspection team reviewed CFS policies and case files, observed the hands-on work of staff, and interviewed all staff.

Accreditation lasts for a five year term. To retain accredited status during that term, a laboratory is expected to maintain accreditation standards. This is demonstrated by (1) an annual review report filled out by the laboratory director, confirming continued compliance with all criteria; and (2) proficiency testing reports submitted by approved external test providers to the ASCLD/LAB Proficiency Review Committee. Any discrepancy in a proficiency test requires that immediate corrective action, including a new re-testing of the individual analyst responsible for the discrepancy. In addition, ASCLD/LAB will investigate any complaint made to it regarding an accredited

laboratory during the five year term, and the Board reserves the right to re-inspect a laboratory during the accreditation term. Sanctions against an accredited laboratory include probation, suspension and revocation of accreditation.

Highlights of the current ASCLD/LAB accreditation requirements particularly relevant to the issues raised at the Inquiry include the following:

- The laboratory must have written objectives which are clearly determined, articulated and communicated.
- There must be written and well understood procedures for personnel issues such as job requirements and personnel evaluations, as well as for the handling and preservation of evidence, preparation and security of case records, and maintenance and calibration of instruments.
- There must be critical evaluation of scientists by supervisors, who must carefully review all laboratory activities, methods and personnel.
- There must be a training program for each functional area. Every trainee must perform a series of proficiency tests which must be satisfactorily completed before the analyst is assigned to independent casework. In addition, there should be a formalized personnel development program (involvement in professional organizations, staff development seminars, technical training programs etc.), as well as a forensic library and a system for review by personnel of new literature.
- There must be a system to ensure the integrity of all physical evidence within the control of the laboratory. A chain of custody record must be maintained, documenting the history of each evidence transfer over which the laboratory has control. Evidence must be sealed and marked for identification, and must be protected from loss, cross-transfer, contamination or deleterious change. Every effort must be made to save as much material as possible for possible re-analysis

in the future.

- The laboratory must have a documented quality system, including a quality manual which is under the control of a quality manager. The quality system must be reviewed by laboratory management at least once yearly to ensure its continued suitability and effectiveness. In addition, there must be a yearly internal audit of each accredited discipline, with audit reports to the laboratory Director, including recommendations for improvements. The quality system should include a complaint mechanism, and a plan for corrective action when discrepancies are identified.
- Technical procedures must be documented. Procedures used must be generally accepted in the field or supported by scientific data. Procedures must use controls and standard samples to ensure the validity of results. Reagents, instruments and equipment must be routinely tested and maintained for reliability.
- Case records, such as notes, worksheets etc. must be generated and kept by the laboratory, with each page of every document bearing the case identifier. Documentation to support conclusions must be such that in the absence of the examiner, another competent examiner or supervisor could evaluate what was done and interpret the data. The case record should include records of all case-related conversations.
- Conclusions reported must be within the range of acceptable opinions of knowledgeable individuals within the field of forensic science, and be supported by sufficient scientific data. Limitations of the results should be clearly stated. Obscure, overly technical and potentially misleading language is to be avoided.
- A representative number of reports must be subject to a peer technical review. A sufficient percentage of reports should be technically (peer) reviewed for each individual in each area to ensure that the conclusions reported are

reasonable and are within the constraints of scientific knowledge. Administrative reviews of all reports must be conducted to ensure the completeness and correctness of the reports issued.

- The laboratory must follow a written procedure whereby the testimony of each examiner is monitored at least once every year, to evaluate the delivery of the examiner's testimony and to ensure that the testimony is scientifically consistent with the findings documented in the case file, including the expression of limitations where necessary. This may involve observation by a peer in court (recommended), review of transcripts, or completion of evaluations by one or more court officers. Feedback to the examiner is required.
- When the validity of results become questioned, the procedures involved must be reviewed and, if necessary, withdrawn from service until an exhaustive review and testing demonstrate that the procedure is no longer a source of error.
- Each laboratory must have a program of proficiency testing which measures the capability of its examiners and the reliability of its analytical results. Each examiner must complete at least one proficiency test annually in each functional area in which they perform casework. The form of proficiency testing is as follows: Each laboratory must participate in proficiency testing programs in which samples are provided by external test providers approved by ASCLD/LAB. Such testing must be conducted annually in every discipline in which a laboratory seeks accreditation. In addition, each laboratory should conduct appropriately spaced inter- or intra laboratory proficiency testing of individual examiners using the re-examination, blind, or known standards techniques. The method of testing must be documented. For compliance with this criterion the laboratory must be conducting such tests in all accredited disciplines.
- All scientists in trace evidence must have a bachelor's degree in a natural science or in criminalistics. In addition, training must take

place in the laboratory, such that a trainee demonstrates competence in all applicable areas of examination prior to performing independent case-connected examinations. Experience/training outside the laboratory may be substitute for internal training only to the extent that it is relevant.

The ASCLD/LAB accreditation program is not the only one in existence. The International Standards Organization (ISO) has created an ISO 25 Guide. Dr. Tilstone explained that this is an overall international guide for lab accreditation or performance. The ASCLD/LAB program meets most, but not all, of its expectations. The two main differences are that ISO 25 requires labs to conduct audits of its operations each year, whereas this is not an absolute must for ASCLD/LAB accreditation, and ISO standards are very strong and very strict on document control, whereas ASCLD/LAB is “pretty silent” on the issue.

Australia has its own National Association of Testing Authorities (NATA) forensic program. The requirements of this program are combined with the ASCLD/LAB and ISO requirements under the auspices of a joint NATA-ASCLD/LAB accreditation program. Its accreditation criteria were filed as Exhibit 262 in the proceedings before me. Dr. Robertson explained that the joint program differs from ASCLD/LAB accreditation in several respects. For example, it requires laboratories to conform to almost all of its criteria (whereas ASCLD/LAB only requires conformity with less than half), its occupational health and safety criteria are much stronger, and it mandates greater documentation of test methods and procedures.

The Centre outlined in detail how accreditation and other measures taken by it since the Morin proceedings and during this Inquiry provide quality assurance:

The training, proficiency testing and peer review now required by accreditation is designed to provide assurance, on an ongoing basis, that CFS scientists are competent to perform both the technical and communicative aspects of their work. An enhanced training program, including written materials and formal testing, provides the initial basis for this assurance. Technical manuals ensure that all scientists are adhering to specified procedures and protocols. In

subjective analyses, including hair and fibre analyses, a second scientist now must always conduct an independent review of the findings of the primary scientist. Administrative reviews of all files are required to ensure that the findings reported by scientists are always scientifically acceptable, and technical reviews of a sampling of files are required to ensure that the case files contain notes which support all reported findings.

The program of proficiency testing measures the capability of examiners and the reliability of analytical results. Each examiner must complete at least one proficiency test annually in each functional area in which they perform casework. In addition, the laboratory is required to participate in proficiency testing programs in which samples are provided by external test providers approved by ASCLD/LAB. Such testing is conducted annually in every discipline. In addition, the CFS conducts other internal and external proficiency testing of individual examiners using the re-examination (re-doing an existing case), blind, and known standards techniques. The CFS intends to increase the regularity of this testing and has appointed a quality manager to drive this process.

The program of court monitoring at the CFS involves observation of testimony in court by another scientist or supervisor who evaluates the objectivity, clarity and scientific accuracy of the testimony provided. This is carried out at least once per year for every individual. The CFS has also launched a 'court card' program which will permit written feedback from counsel regarding the performance of a scientist following each trial. On some occasions, particularly if a concern arises regarding the testimony of an individual, transcripts are also reviewed.

Where any of these processes reveals a deficiency, immediate steps are taken to remedy the work done and to provide remedial assistance to the individual scientist involved. Where appropriate, scientists are taken off casework while training is provided. If the required improvement is not achieved, the scientist will be demoted or terminated.

Over and above accreditation, the CFS has also

adopted all of the standards set by the Technical Working Groups (TWG) (composed of forensic scientists from North America, Europe and Australia) in both the DNA and trace evidence areas. These standards set out a recommended approach on matters such as what tests and procedures should be used, and in this respect are more stringent than the standards of ASCLD/LAB. The CFS is an active participant in all of the TWG groups applicable to CFS work, except for document examination.

.....

In 1997 ... a number of full time quality assurance positions were created, including a quality assurance manager, four other quality assurance personnel, a standards officer and a training officer. The members of this new quality assurance unit will be senior scientists. They will be devoting all of their time to maintenance of the quality assurance program, including design and implementation of training and proficiency testing, and follow up with corrective action when necessary. One of the first tasks recently assigned to the standards officer is the creation of a comprehensive policy manual, the substance of which will include many of the issues which have been raised in the Inquiry.

.....

In addition to these requirements, since the mid 1980's, the CFS's underlying program of hands-on training by senior scientists has been enhanced to include greater standardization through more reliance on written training manuals and increased formal testing. Also, the CFS has recently examined the training programs of leading forensic institutions around the world, with a view to incorporating new ideas into its own programs.

The CFS encourages all scientists to participate in seminars, conferences etc. put on by other institutions, such as the American Association of Forensic Sciences of which a number of senior CFS staff are members. One CFS scientist has recently participated in a course on report writing which took place in England. The CFS has conducted staff meetings and seminars on the

lessons to be learned from this Inquiry, and will also be showing staff video-tapes of evidence from this Inquiry relating to forensic science. Staff of the CFS are also encouraged to participate in the Canadian Society of Forensic Science which provides educational programs as part of its annual meetings, which meetings the CFS periodically hosts.

The CFS recognizes, as was stated by Dr. Robertson, that the difficulty with training programs, as with other quality assurance matters, is that not only must opportunities be provided, but management must also ensure that staff make use of such opportunities in a meaningful way. This was one motivation for the creation of the new quality assurance unit described above. It is submitted that the full time attention to quality assurance of a group of senior scientists is the best way to achieve meaningful quality assurance within an institution such as the CFS.

Cautionary Notes As to Accreditation

The Centre's commitment to the accreditation process, and to enhanced training and quality assurance standards is commendable. I am satisfied that the Centre's policies are evolving to meet, and often surpass, standards set in the forensic community. There are some acknowledged deficiencies in the minimum standards set by the accreditation process, however. In part, these are reflected in the specific recommendations which are contained later in this Report. As well, many of the improvements reflected in the Centre's submissions are, as of yet, untested. This has prompted some parties to urge upon me that I recommend an internationally conducted audit in 12 to 24 months to ascertain the true extent to which the announced improvements are realized. I address this concern later in the Report as well.

There are two overriding concerns which I need express, both for the benefit of those at the Centre who will be working on quality assurance in the upcoming years, and to explain the recommendations which follow.

As the Centre's submissions point out, the forensic scientist must excel both in the technical and communicative aspects of his or her work. I am satisfied that accreditation, and the enhanced programs reflected in the Centre's submissions, go far in ensuring that its scientists perform the

technical aspects of their work well. However, many of the most significant failings identified here have to do with the communicative aspects of the scientist's work, and I embrace within those aspects the interpretation of technical tests and their significance, and the objectivity brought to bear upon those interpretations. As Dr. Blake noted:

[M]erely getting the right answer in a test is only part of what a forensic scientist does. It's interpreting that work in the context of the case situation, and being able to present that kind of information effectively to a lay audience that is also a critical part of what a forensic scientist does. And the accreditation process, I would suggest, deals with that aspect only minimally.

Some of accreditation's 'weak spots' pertain to the communicative aspects of the scientist's work: for example, the court monitoring requirement is minimal; currently, ASCLD criteria do not address the content of reports in any significant way; others areas are better addressed by ISO or NATA requirements.

The Centre has already alluded to Dr. Robertson's concern:

The difficulty in these matters is that mostly what they are testing is management having put in place the opportunities for people to participate in training and development. One of the key challenges for managers is to ensure that staff actually do take those opportunities in any meaningful way.

It follows that accreditation and the other enhanced quality control measures are of vital importance, but they do not represent the complete answer. The *Morin* case is illustrative. During the currency of the Morin proceedings, communication skills were already a key component of recruitment and training at the Centre. I was told that Ms. Nyznyk underwent a mock trial. She passed proficiency tests and she was taught technical and interpretative accuracy, clarity and objectivity, including the forthright disclosure of the limitations of the evidence. Nonetheless, Ms. Nyznyk overstated evidence, misunderstood the literature pertaining to her discipline, communicated poorly and with lack of precision and lost objectivity. With accreditation came increased technical reviews, together with administrative reviews of all reports. However, Ms. Nyznyk's reports were administratively reviewed by Mr. Erickson. He re-did all of her testing prior to the second trial

(*i.e.*, effectively performed a technical review). He was the section head at the time. Mr. Erickson's conduct did not meet standards then in existence either. Everybody at the Centre was educated as to the dangers of contamination. Nonetheless, it occurred and its existence was suppressed. I am sure that the CFS was empowered back then to take action to address the overstatement of evidence. Accreditation has not fundamentally changed that either. All of this to say that the CFS standards in existence at the time (which met or surpassed the forensic community's standards at the time) cannot be faulted for many of these failings. Accreditation does not necessarily bring with it an assurance that these failings would not be repeated. I do not believe that Dr. Young would suggest otherwise. The recommendations which follow place particular emphasis on those changes which can best ensure a culture of independence and objectivity, together with the communication of accurate and fair findings.

(xi) Recommendations

Recommendations are in bold print. Some commentary may precede or follow these recommendations.

Recommendation 2: Admissibility of hair comparison evidence

Trial judges should undertake a more critical analysis of the admissibility of hair comparison evidence as circumstantial evidence of guilt. Evidence that shows only that an accused cannot be excluded as the donor of an unknown hair (or only that an accused may or may not have been the donor) is unlikely to have sufficient probative value to justify its reception at a criminal trial as circumstantial evidence of guilt.

A central issue at this Inquiry has been whether hair and fibre comparison evidence should be admissible in a criminal trial as circumstantial evidence of guilt. The issue raises fundamental questions not only about hair and fibre comparison evidence, but also as to the admissibility generally of individual pieces of evidence in a wholly or largely circumstantial case.

At Guy Paul Morin's trials, evidence was led by the prosecution that the necklace hair was microscopically similar to Guy Paul Morin's known hair samples, such that he could have been the donor of the necklace hair. Prior to the second trial, analysis of Christine Jessop's classmates' hairs showed that the necklace hair was also microscopically similar to the known hair samples

of two of these classmates, such that either one of them could have been the donor of the hair. Mr. Erickson advised the Crown that the hair comparison had extremely limited probative value. Nonetheless, the experts detailed the various points of comparison at the second trial, as did Crown counsel in his closing address. Two of the jury's questions were directed to the necklace hair comparison.

The necklace hair comparison yielded nothing more than the conclusion that Guy Paul Morin, two of Christine Jessop's classmates and countless others could have been the donors of the necklace hair. Assuming that this conclusion is scientifically valid, should it be heard by a jury?

Trial judges are entitled in law to exclude evidence sought to be tendered against an accused where its probative value is exceeded by its prejudicial effect. Trial judges fully exercise this discretion in the context of evidence which is presumptively inadmissible against an accused — the most obvious example being evidence which reflects adversely upon the accused's character. Canadian courts have not subjected hair and fibre comparison evidence (and certain other categories of forensic evidence) to the same critical analysis. This may be because the prejudicial effect of the evidence is less obvious. Equally likely, it may be that courts have not seriously thought about the true probative value of this evidence.

Evidence that an accused cannot be excluded as the donor of a hair left by the perpetrator may, in limited circumstances, have a high degree of probative value. For example, if the offence was likely committed by one of two suspects, evidence that a hair left by the perpetrator could have come from one suspect and could not have come from the other may be highly probative. Dr. Robertson pointed to the situation of an automobile accident, where the authorities wish to identify the driver and know from the start that it was one of the four people who were in the car. Evidence that only one of the individuals cannot be excluded as the donor of a hair left on the driver's seat may be of real probative value.

In the vast majority of cases, however, such evidence has extremely limited probative value: it merely permits the trier of fact to infer that the accused is one of a limitless class of persons who cannot be excluded as the perpetrator based upon this analysis.

The forensic scientists who appeared before me generally agreed that

hair comparison evidence was valuable as an exclusionary tool, but had limited utility as an inclusionary tool. Roger Cook testified:

A. My own personal view is that hair analysis has got limited significance, but it has got some, and, as I say, you can say that the hair didn't come from an individual and sometimes that's very helpful to the individual concerned.

.....

Q. But, when we start talking about fractured medullas, and stuff like that, I wonder, really, is there much significance that can be gleaned from it for the purpose of forensic application?

A. Well, I think, if you asked a number of different forensic scientists that question, you'd get a wide range of answers. Some people would say that it's very useful, others would say that it's got limited significance, and I'd fall into that camp.

Dr. Blake said this:

The problem with hair is that when the hairs are microscopically similar, you don't know what that means. That is, you don't know what value that microscopic comparison has in disproving a false hypothesis. And it's the inability to assess your own ability to disprove a false hypothesis that is the problem that hair examiners, and maybe to some extent, fibre examiners are confronted with. We can't make that evaluation like we can with genetic testing. That doesn't mean that the whole exercise is completely useless; it just means that the inherent information content of the exercise is usually much less.

Mr. Lucas testified that hair comparisons have considerable value for exclusionary purposes, but only limited value for inclusionary purposes. He was of the view that we cannot do without hair and fibre evidence given its usefulness in some circumstances. Mr. Lucas did a study a few years ago and found that in many murder cases the evidence was very useful in excluding individuals, and in at least offering the potential of a relationship between two

persons, a thing and a person, or two things. Mr. Lucas added that in cases where there are no bodily fluids, “there isn’t a lot more to assist.”

Mr. Erickson testified that he did not think that the necklace hair should have been introduced into evidence in Mr. Morin’s trial; its probative value was too limited. On a more general level, he supported the introduction of rules which would limit the admissibility of hair evidence:

Q. Yes. Do you think, sir, that perhaps when you only have a single hair comparison, for example, as you did in this case, that the evidence simply shouldn’t be given in those circumstances. That it’s only when you have a substantial number of unknown hairs that correspond to known hairs, that that would give you a necessary degree of reliability to a finding, to present it to a jury?

A. Well, I wouldn’t totally exclude doing a single hair analysis because that single hair may have a number of features and characteristics that could be related back to the comparison sample. But, if it’s a hair that has very few features or lack of features — is what I’m saying, and one could only say it could be from this source, I don’t say that should not be done.

.....

Q. [I]t would seem, then, that you would acknowledge that a rule of exclusion by the courts that would have been sufficient to exclude any evidence about the necklace hair in the Morin case would be a rule that could meet with your approval.

A. Yes, I felt that way when I wrote that letter.

.....

Q. The other thing I’m going to suggest to you, sir, and it really is perhaps not so far off your views either, is that hair analysis should only be allowed to be presented to a jury as an inclusionary item of evidence, if there is a one-to-one match between at least one questioned hair and the known hairs. Do you have a problem with that, sir?

A. I have no difficulty with that at all.

The fact that comparative hair analysis has no utility other than in the forensic context, primarily to connect persons to crimes, can lead to its misuse. Mr. Crocker said this:

Q. And the concern that I would express to you is that if you have a science of hair analysis that has, as its primary objective, the connecting of individuals with crime that has no other objective scientific use, that there can be a risk that it can ultimately be misused?

A. Oh, I'm sure it has been. I think — what the courts really have to look at is, I suppose, the persons training and experience and reliability because there are some terrible, terrible opinions being given, that I'm aware of.

The added difficulty with hair comparison evidence is that its prejudicial effect may be substantial, since the scientific opinion brings with it an aura of respectability and infallibility. The length and complexity of testimony which must be examined to produce the minute conclusion that the accused cannot be excluded as the donor of the unknown hair has the potential to mislead the jury and cause the testimony to acquire a prominence and importance out of all proportion to its insignificance. Any trier of fact, hearing an exhaustive detailing of the minutiae of hair similarities found, could easily (and understandably) conclude that only some legal or professional restraint prevents the experts from saying that the compared hairs come from a common source. Indeed, Mr. McGuigan very persuasively suggested in his jury address that, apart from the experts, a 'common sense' approach to the hair and fibre evidence led inexorably to the conclusion that Christine Jessop had been in the Morin Honda.

In *R. v. Mohan*,⁵⁴ the Supreme Court of Canada articulated the four criteria for the admissibility of expert testimony:

1. relevance;
2. necessity in assisting the trier of fact;
3. the absence of an exclusionary rule; and
4. a properly qualified expert.

⁵⁴ (1994), 89 C.C.C. (3d) 402 at 411 (S.C.C.).

In the context of necessity, Sopinka J. reflected that the need for the evidence is assessed “in light of its potential to distort the fact-finding process.” He did note that the “ possibility that evidence will overwhelm the jury and distract them from their task can often be offset by proper instructions.”

Similar considerations are noted by Sopinka J. as an aspect of the relevance of the proffered evidence. He noted, as I have, that trial judges are empowered to exclude expert evidence that is otherwise logically relevant on the basis that its probative value is overborne by its prejudicial effect. In this regard, he stated:

Relevance is a threshold requirement for the admission of expert evidence as with all other evidence. Relevance is a matter to be decided by a judge as question of law. Although *prima facie* admissible if so related to a fact in issue that it tends to establish it, that does not end the inquiry. This merely determines the logical relevance of the evidence. Other considerations enter into the decision as to admissibility. This further inquiry may be described as a cost benefit analysis, that is “whether its value is worth what it costs” ... Cost in this context is not used in its traditional economic sense but rather in terms of its impact on the trial process. Evidence that is otherwise logically relevant may be excluded in this basis, if its probative value is overborne by its prejudicial effect, if it involves an inordinate amount of time which is not commensurate with its value or if it is misleading in the sense that its effect on the trier of fact, particularly a jury, is out of proportion to its reliability. While frequently considered as an aspect of legal relevance, the exclusion of logically relevant evidence on these grounds is more properly regarded as a general exclusionary rule...Whether it is treated as an aspect of relevance or an exclusionary rule, the effect is the same. The reliability versus effect factor has special significance in assessing the admissibility of expert evidence.

There is a danger that expert evidence will be misused and will distort the fact-finding process. Dressed up in scientific language which the jury does not easily understand and submitted through a witness of impressive antecedents, this evidence is apt to be

accepted by the jury as being virtually infallible and having more weight than it deserves. (Emphasis added.)

In *R. v. Melargni*,⁵⁵ Moldaver J. (as he then was) applied a “threshold test of reliability” to novel expert evidence. One question which he asked himself was whether the jury was likely to be overwhelmed by the “mystic infallibility” of the evidence, or whether the jury will be able to keep an open mind and objectively assess the worth of the evidence.

Sopinka J., citing *Melargni* with approval, concluded that

expert evidence which advances a novel scientific theory or technique is subjected to special scrutiny to determine whether it meets a basic threshold of reliability and whether it is essential in the sense that the trier of fact will be unable to come to a satisfactory conclusion without the assistance of the expert. The closer the evidence approaches an opinion on an ultimate issue, the stricter the application of this principle.

Some may suggest that the reliability of hair and fibre analysis, when used for inclusionary purposes, should be revisited as if it represented ‘novel’ science. The authors of “Forensic Hair Comparison Analysis: Nineteenth Century Science or Twentieth Century Snake Oil?”⁵⁶ would certainly take that position, contending that this evidence has rarely been subjected to this kind of scrutiny in the United States. Some excerpts follow:

Forensic hair comparison analysis has not undergone much challenge in the courts. Some courts have held that hair comparison analysis, standing alone, may not be sufficient to support an arrest or a conviction. Sometimes hair evidence has been *so* tenuous as to be considered improperly admitted. On a very rare occasion, the courts have rejected hair analysis, holding that testimony that two hair samples

⁵⁵ (1992), 73 C.C.C. (3d) 348 (Ont. Ct. (Gen. Div.)).

⁵⁶ Clive Smith and Patrick Goodman (1996), 27 Columbia Human Rights Law Review 227 at 229.

“*could have* come from the same person” was simply speculation, unsupported by scientific fact.

By and large, however, forensic hair analysis has been generally accepted by our courts for many years, with little fuss or skepticism. It is time for a reevaluation. If the purveyors of this dubious science cannot do a better job of validating hair analysis than they have done so far, forensic hair comparison analysis should be excluded altogether from criminal trials.

.....

[I]t is the thesis of this Article that forensic hair comparison analysis has been accepted uncritically into criminal prosecutions, without being subjected to the validation required of any legitimate science. In forensic hair comparison analysis, as with other such techniques, there are some major concerns that must be addressed before this evidence may be used to deprive an individual of liberty or — in capital cases — life itself.

.....

There is little difference between the techniques of present-day examiners and those used at the turn of the century. Perhaps the microscope is a little clearer, but the art remains largely unchanged. Basically, a technician is provided with a certain number of questioned hairs (hairs from an unknown source, found at the crime scene) to compare with a set of known hairs from the victim and a set of known hairs from the suspect. The known hairs of the victim are pulled from the scalp and the pubic region, and mounted together on slides; likewise the hairs of the suspect. The questioned hairs are also mounted on slides. The questioned hairs are then placed on one side of a binocular microscope, and the victim’s and the suspect’s hairs are separately compared to them. The examiner compares two hairs at a time, preferably along their entire length, since hair characteristics may vary considerably from root to tip.

The examiner identifies the hair as coming from one of three racial groups — “Caucasian”, “Negroid”, or “Mongoloid”. The examiner also identifies whether

the hair is from a particular body part — scalp, pubic or limb hair, for example — and sorts the hair accordingly, only comparing hairs which come from the same body part. Then, after inspecting the hairs for colour, diameter, and various other characteristics, the examiner determines whether the questioned hairs are microscopically “indistinguishable”, and therefore consistent with the hypothesis that they originate from the same person, or “distinguishable”, and therefore excluded from that hypothesis.

.....

In a blind testing procedure carried out by the Law Enforcement Assistance Administration (LEAA), 240 crime laboratories from around the United States took part in a comparative study. Out of ninety responses for the hair portion of the survey, the proportion of laboratories submitting “unacceptable” responses on a given sample — either failing to make a match or making a false match — ranged from 27.6 to 67.8 percent.

.....

Apologists for the technique of forensic hair comparison analysis may argue that their trade does not occur in a vacuum, and that their conclusions are buttressed by other evidence. This is correct when a confession confirms pubic hair evidence of a rape. However real life can also cut the other way, enhancing the probability of an error, with the technician’s belief that the “right” person has been arrested tainting the approach to the hair comparisons. If it is to be accepted as probative of anything, hair analysis must stand or fall on its own merits, without reference to other evidence in an actual criminal case.

In the least, paraphrasing *Mohan*, there is a danger that hair and fibre evidence will be misused and will distort the fact-finding process. Dressed up in scientific language which the jury does not easily understand and submitted through a witness of impressive antecedents, this evidence may be accepted by the jury as being virtually infallible and having more weight than it deserves. Yet its probative value may often be insufficient to justify its reception.

The answer to these concerns is often said to be this. Evidence in a circumstantial case must be viewed cumulatively. Each piece cannot be examined in isolation. Accordingly, this evidence, viewed together with the other circumstantial evidence, may permit a reasonable inference that the accused is the perpetrator. Any deficiencies in the evidence's value can be fully explored by the defence.

It is true that a piece of circumstantial evidence cannot be examined in isolation. However, it is equally true that it must pass some litmus test or threshold test in order for it to have sufficient probative value to overcome its prejudicial effect and justify its reception. Recognizing that a piece of evidence must be viewed in context and as part of a circumstantial case does not mean that a trial judge is to abandon any effort to weigh the probative value against the prejudicial effect in a circumstantial case.

There are at least two dangers here. The first danger is that worthless evidence plus worthless evidence plus worthless evidence may still logically amount to a worthless case, but it may not be properly evaluated as such by the trier of fact. Indeed, it is my view that this reflects part of the cause of Mr. Morin's conviction. The jury was inundated with so many pieces of evidence which had dubious probative value — "it could have been his hair," "it could have been her hair," "it could have been his fibres," "it could have been blood in his car," "he didn't go to her funeral," "he didn't assist in her search," "he sounded unconcerned when he talked about her death," "he stared straight ahead at a television when a police officer questioned his mother" — that they acquired in the jury's minds a significance which they did not (or should not) possess, individually or cumulatively. In my view, this inundation of what has been labelled by some as 'junk evidence' also likely infected the jury's assessment of other evidence which was so patently unreliable that it might otherwise have been easily discarded — Paddy Hester, Janet Jessop's funeral scream evidence, the dog scent evidence, the in-custody informer evidence.

The second danger is that other evidence which has some weight and is worthy of consideration by a jury (whether or not sufficient to sustain guilt) may elevate this evidence of minimal value to a heightened credibility it should not possess.

American courts have wrestled with the admissibility of hair and fibre comparison evidence which yields no more than 'it could have been the accused.' Generally, the courts have held that hair comparison evidence is

admissible, the inconclusiveness of the evidence being a matter of weight. In some cases, the courts have demanded that there be other evidence linking the accused to the offence. In *State v. Stallings*,⁵⁷ for example, the Court of Appeals of North Carolina concluded that the totality of the evidence raised no more than conjecture of the accused's identity as the perpetrator. As to the microscopic hair comparison analysis evidence, the Court commented:

Unlike fingerprint evidence, however, comparative microscopy of hair is not accepted as reliable for positively identifying individuals. Rather, it serves to exclude classes of individuals from consideration and is conclusive, if at all, only to negative identity. [citation omitted] Our review of the North Carolina cases involving comparative microscopy evidence indicates that it must be combined with other substantial evidence to take a case to the jury.

With respect, I am not sure that this analysis goes far enough.

There are cases in which the courts have found hair comparison evidence "contingent, speculative or merely possible" where there is an insufficient connection between hair found at the crime scene and the accused's hair.⁵⁸

The Oklahoma District Court in *Williamson v. Reynolds*,⁵⁹ following the 1993 decision of the United States Supreme Court in *Daubert v. Merrell Dow Pharmaceuticals*,⁶⁰ held that microscopic hair comparison evidence was

⁵⁷ 334 S.E.2d 485 at 486 (N.C. App. 1985). See also *State v. Johnson*, 338 S.E.2d 584 (N.C. App. 1986); *State v. Faircloth*, 394 S.E.2d 198 (N.C.App. 1990) On the other hand, commentators have noted that the hair comparison may be tainted by the analyst's belief in guilt; see Clive A. Stafford Smith and Patrick D. Goodman, "Forensic Hair Comparison Analysis: Nineteenth Century Science of Twentieth Century Snake Oil" (1996), 27 *Columbia Human Rights Law Review* 227 at 259.

⁵⁸ See *State v. Williams*, 400 S.E.2d 131 (S.C. 1991), where the Court held that the admission of evidence of hair found on a blanket seized 19 months after the crime, which lacked sufficient connection to the accused, was unfairly prejudicial.

⁵⁹ 904 F.Supp. 1529 (E.D.Okl. 1995).

⁶⁰ *Daubert v. Merrell Dow Pharmaceuticals*, 113 S.Ct. 2786 (1993), holding that a federal trial judge is obliged under the Federal Rules of Evidence to screen all scientific

unreliable and inadmissible:

[I]n analyzing Petitioner’s case under the guidelines of *Daubert*, this court has found an apparent scarcity of scientific studies regarding the reliability of hair comparison testing. The few available studies reviewed by this court tend to point to the method’s unreliability. Although probability standards for fingerprint and serology evidence have been established and recognized by the courts, no such standards exist for human hair identification. Since the evaluation of hair evidence remains subjective, the weight the examiner gives to the presence or absence of a particular characteristic depends upon the examiner’s subjective opinion.

.....

This court has been unsuccessful in its attempts to locate *any* indication that expert hair comparison testimony meets any of the requirements of *Daubert*. Not even the “general acceptance” standard is met, since any general acceptance seems to be among hair experts who are generally technicians testifying for the prosecution, not scientists who can objectively evaluate such evidence. (Emphasis original.)

.....

[T]here is no research to indicate with any certainty the probabilities that two hair samples are from the same individual

This court, therefore, finds that the introduction into evidence of expert hair testimony at Petitioner’s trial was irrelevant, imprecise and speculative, and its probative value was outweighed by its prejudicial effect. *The state of the art of hair analysis has not reached a level of certainty to permit such testimony.* Although the hair expert may have followed procedures accepted in the community of hair experts, the human hair comparison results in this case were, nonetheless, scientifically unreliable. This court

evidence for both relevance and reliability. Compare *Mohan, supra*.

recognizes the long history of admissibility of such evidence, but as the *Daubert* Court stated, “[H]ypotheses ... that are incorrect will eventually be shown to be so.”⁶¹ (Some emphasis added.)

I do not think it appropriate to articulate any hard and fast rules as to when such evidence should be admitted in a criminal trial. As Dr. Young pointed out, the potential uses of the evidence will vary case by case, and advances in technology may alter the value of a particular analysis. In my respectful view, however, it is appropriate for trial judges to undertake a far more critical analysis of the admissibility of this kind of evidence. My own view is that hair comparison evidence of the kind introduced in the *Morin* case should rarely be admitted for inclusionary purposes.

Nothing that I have said is intended to inhibit the *informed* use by investigators of hair comparison evidence *for investigative purposes*. Similarly, nothing that I have said is intended to inhibit the use of this evidence for exclusionary purposes or to discriminate from within a finite group of persons who could have contributed an unknown hair. Finally, I appreciate that hair specimens may, unlike those found in the *Morin* case, be amenable to DNA testing. My comments do not address the comparison of hairs through DNA analysis.

In its submissions, the CFS reflected the recent approval of new equipment to facilitate the work of the hair and fibre unit:

[I]t is important that a properly equipped laboratory keep up with changes in technology which improve the ability to discriminate between hairs and fibres. To this end, the CFS Director has recently approved the purchase of a variety of new equipment, including an FTIR spectrometer with accessories, new accessories for the microspectrophotometer, fluorescence stereo microscopes, a new fluorescence comparison microscope and a fibre finder. In addition to enhancing the ability to discriminate between hairs and fibres, this new technology may also improve the timeliness of hair and fibre analysis. Notably, new technology has also made it possible to photograph or otherwise make a printed reproduction of all exhibit materials. This is

⁶¹ At 1556-1558.

now done at the CFS on a routine basis and the reproduction is retained in the case file. The hair and fibre unit at the CFS will now be one of the best equipped in the world.

Counsel for the Morins suggested that I should be undeterred by this recent decision to invest heavily in hair and fibre-related equipment and recommend that the unit's work be sharply curtailed and the financial resources directed elsewhere. With respect, I do not agree. As noted above, I continue to recognize that there are legitimate uses to be made of hair and fibre evidence. Indeed, added technology *may* enhance those uses some day. To paraphrase Mr. Lockyer's submissions made in another context, should the new technology permit the Centre's analysts to exclude one person from unjust prosecution or conviction, the money will have been well spent.

Recommendation 3: Admissibility of fibre comparison evidence

Evidence of forensic fibre comparisons may or may not have sufficient probative value to justify its reception at a criminal trial as circumstantial evidence of the accused's guilt. However, the limitations upon the inferences to be reliably drawn from forensic fibre comparisons need be better appreciated by judges, police, Crown and defence counsel. This requires better education of all parties, improved communication of forensic evidence and its limitations in and out of court, in written reports and orally.

Similar issues (to hair analysis) are raised in connection with fibre comparison evidence. Based upon the expert testimony before me, I expect that there is a greater number of cases where fibre comparison evidence has sufficient probative value to justify its reception as circumstantial evidence of guilt. I make this observation with some reticence. Mr. Cook, whose evidence was most impressive, outlined in some detail the tenor of the Jackson and Cook Study (referred to at some length earlier in this chapter). The message which I took from his analysis, apart from the irrelevance of the study to the Morin prosecution, was how little one can reliably say about the significance of fibre similarities. Such similarities may well be evidence of direct contact between the suspect and the victim or the crime scene. However, the real issue is the extent to which science can say, with a degree of reliability, that direct contact, as opposed to other possibilities, explains the fibre similarities. Dr. Tilstone noted the problem:

If you look at [the issue of unreliable science] in regard to your prompting about hairs and fibres, an example of an illustration that I've used in documents which we have, is that if a lab finds no differences in two sets of fibres, one recovered from person A, and the other recovered from person B, the conclusions that can be drawn from that can be extremely limited. And in particular, the question has to be posited: Is this fibre material there because of secondary transfer. In other words, did it come because both person A and person B had been in contact with some third common source?

And very often, the answer to that is, it depends on the numbers of recovered fibres, and people will say if you find a lot of fibres, it must have come from primary contact, and if you find very few, it must have come from secondary contact. And I think some people would use most. Now I don't believe that that's good science, because I don't know of any way you can challenge that hypothesis and say there is a certain number of fibres above which it's primary contact, and below which it must be secondary contact. And I'm using secondary contact deliberately rather than contamination. It could have been some kind of legitimate situation.

So these are just two examples, the common blood grouping and the interpretation of transferred fibres, which I think if they're subjected to rigorous principles of scientific testing leave you with conclusions which are not at all compelling.

Much more research needs to be done in this area. There may well be cases where the quality and quantity of the fibre findings permit certain inferences to be safely drawn. Not surprisingly, I am unable to define what those cases are. However, the experts (and I) agree that the *Morin* case was not one of those cases. This Inquiry has served to identify the limitations upon the inferences that can reliably be drawn from fibre comparisons, *particularly based upon only a handful of fibres*. A number of fallacies associated with fibre comparison evidence have been noted. The inherent fragility of comparing two extraneous fibre populations has been exposed. The relevance of environmental contamination has been spotlighted. It is important that judges, investigators, Crown and defence counsel correctly apprehend these limitations. As in the *Morin* case, fibre comparisons, correctly apprehended,

may not have sufficient probative value to justify their reception as circumstantial evidence of guilt in a criminal case.

Recommendation 4: Admissibility of preliminary tests as evidence of guilt

Evidence of a preliminary test, such as an ‘indication of blood,’ does not have sufficient probative value to justify its reception at a criminal trial as circumstantial evidence of guilt.

Robert White testified at Mr. Morin’s trials that he found indications of blood on three areas of the Morin Honda. The quantity of the substance detected in the Honda was insufficient to permit its positive identification as blood. Mr. White’s evidence was based on the results of the lowest level of serological test. This type of test is commonly known as a presumptive test, because it alone cannot positively identify the nature of a substance under examination with any real degree of reliability.

Dr. Blake questioned whether such testing is capable of answering any material fact in dispute, and pointed out that in some American states such results would be inadmissible. Mr. Cook testified that presumptive tests are sometimes reported in England. He accepted that they can be misleading, and suggested that whenever they are used they should be heavily qualified. Mr. Lucas did not agree that preliminary tests should be inadmissible in court. He felt that they have a value, although their limitations have to be explained.

In my view, the probative value of a preliminary test showing ‘indications of blood’ is even more tenuous than the necklace hair comparison. The *Morin* case is illustrative. Robert White’s evidence demonstrated that the Morin Honda contained invisible stains that *might or might not be* human blood. There is no suggestion that he could say that the stains were likely human blood or how likely that was. He could not say anything about the likelihood that the stains were Christine Jessop’s blood. There is no suggestion that he could say anything about the likelihood that such minuscule indications of blood would be found in any vehicle, particularly a well-used and untidy one. With respect, it is no answer to say that the limitations of this evidence were explained to the jury (which they were). It is equally no answer to say that this evidence has little probative value by itself, but becomes significant when taken together with the other evidence (which was the approach advocated by the Crown). The trial judge’s rulings on admissibility

demonstrated his view that this evidence acquired heightened probative value, when considered together with the other evidence against Mr. Morin. With respect, I disagree. The simple answer is that the evidence was valueless in proving that Christine Jessop was in the Morin Honda and ought not to have been admitted.

Though there was no allegation here that Mr. White overstated his findings, I agree entirely with the comments of author Judy Bourke on this issue, which bear repeating:⁶²

The use of preliminary tests to draw positive conclusions occurred in the tests for the presence of blood in *Chamberlain* and *Rendell*, in tests for the detection of foetal blood in *Chamberlain*, and in *Splatt* with respect to bipolarisation analysis and seed identification. It appears that uncritical attitudes to scientific test evidence has permitted recurrent use of preliminary tests in evidence.

Preliminary tests should only be used to guide scientists in the direction of further testing. The use of such results in evidence in court should be minimal. Even accompanied by statements that the test is non-conclusive will not remove the aura of scientific accuracy that surrounds scientific tests. Scientists sometimes do not know the specificity limits to the tests they use. Lawyers need to be aware not only to challenge an expert's credentials and expertise, but also to seek independent expert advice to gauge the reliability of test results.

Absent special circumstances, evidence of preliminary testing results such as 'indications of blood' has insufficient probative value to justify its reception as circumstantial evidence of guilt in a criminal case. The emergence of such evidence in notorious miscarriages of justice or potential miscarriages of justice is not co-incident. Its use in the Morin case before the jury is illustrative. It was also used by the trial judge to support the admissibility of the necklace hair comparison. The necklace hair comparison was used to support the admissibility of the 'indications of blood' evidence. With respect,

⁶² Judy Bourke, "Misapplied Science: Unreliability in Scientific Test Evidence" Parts I and II (1993) 10 Aust. Bar Rev. 123 at 187.

it should not have been so used.

Recommendation 5: Trial judge’s instructions on science

Where hair and fibre comparison evidence or other scientific evidence is tendered as evidence of guilt, the trial judge would be well advised to instruct the jury not to be overwhelmed by any aura of scientific authority or infallibility associated with the evidence and to clearly articulate for the jury the limitations upon the findings made by the experts. In the context of scientific evidence, it is of particular importance that the trial judge ensure that counsel, when addressing the jury, do not misuse the evidence, but present it to the Court with no more and no less than its legitimate force and effect.

In this regard, reference should be made to the judgment of the Ontario Court of Appeal in *R. v. Terceira*.⁶³ Finlayson J.A. advocates similar kinds of instructions in the context of DNA testimony. I also note the trial judge’s (Campbell J.) careful instructions to the jury, citing the “reasons for you to take a good close look at the DNA evidence,” cautioning the jury not to be “overwhelmed by any aura of scientific authority advanced by any of the DNA witnesses” and emphasizing not to “get bedazzled or unduly swayed.”

Recommendation 6: Forensic opinions to be acted upon only when in writing

(a) No police officer or Crown counsel should take action affecting an accused or a potential accused based upon representations made by a forensic scientist which are not recorded in writing, unless it is impracticable to await a written record. Where a written record is not obtained prior to such action, it should be obtained as soon thereafter as is practicable.

(b) The Crown Policy Manual and the Durham Regional Police Service operations manual should be amended to reflect this approach. The Ministry of the Solicitor General should facilitate the creation of a similar policy for all Ontario police forces.

⁶³ *R. v. Terceira*, [1998] O.J. No. 428.

(c) Where a written record is only obtained after such action, and it reveals that the authorities acted upon a misapprehension of the available forensic evidence, police and prosecutors should be mindful of their obligation to take corrective action, depending upon the original action taken. Corrective action would, for example, include the immediate disclosure of the written record to the defence and, if requested, to the Court, where the forensic evidence has been misrepresented (even inadvertently) in Court. It would also include the re-assessment of any actions done in reliance upon misapprehended evidence.

In the Morin investigation, the police obtained and executed search warrants, arrested Guy Paul Morin and testified as to the available forensic evidence at a bail hearing, all in the absence of any written documentation from the CFS. As I have earlier reflected, this approach was fraught with danger — the scientific findings were poorly communicated and poorly understood. It follows from this recommendation that the CFS should either provide an interim report to investigators, record on tape their interim findings or read and sign an officer's notes which articulate those findings and the limitations upon them. There may be exigent circumstances which do not permit the creation of a written record — for example, the communication of an opinion by telephone, followed by the need to immediately apprehend a dangerous offender. In these limited circumstances, a written record should be obtained as soon thereafter as is practicable.

There was widespread support for a recommendation of this kind from the parties at the Inquiry, including the Durham Regional Police Service, Detective Fitzpatrick and the CFS itself. Dr. Young thought it was an excellent suggestion to have scientists record their interim findings, to have the police and the scientist sign them, and to give a copy of the record to the police.

A similar policy to that recommended here is in effect in parts of Australia. Dr. Robertson testified:

Q. Doctor Robertson, one of the systemic issues that arises out of this Inquiry has to do with this scenario. Police officers submit material to a forensic laboratory, such as The Centre of Forensic Sciences for analysis, awaiting anxiously for the results in order to determine whether or not a particular suspect should be charged

with an offence, that an oral report is given as to the results, obtained by the forensic scientist.

And then down the piece, issues arise as to what it was precisely that was communicated by the forensic scientist to the police, whether the forensic scientists overstated his or her findings, or whether or not the police took more from the findings than were stated.

Are you ever asked, or your forensic scientists ever asked to provide oral opinions to the police in advance of a formal written report, and how do you deal with a potential communicative problems that could arise in that situation?

A. Well, the answer to the question is yes, it's not an uncommon occurrence. The NATA guidelines have something to say about it, so I guess if we deal with the black letter of rows to begin with, Section 83, page 26 of the documents being submitted, that says first of all that preliminary or interim reports, which isn't just what you are asking about, must be clearly indicated as such. 831 says that:

Where preliminary or interim reports are issued by telephone, the following must be recorded in the case record. The date and time of the telephone call, the test examination result given and the name of the person to whom the results were given.

So that's the minimum standard that we apply. If the individual, as is often the case, certainly in our organization, is physically there, we get that person to also sign that they have agreed with what is written, and the case filed. And we would follow up a telephone conversation by faxing the individual a written statement of what was actually agreed, if it was in any way substantive, and we would follow that up quickly by a properly typed interim statement which again, spelled out what we'd agreed.

Recommendation 7: Written policy for forensic reports

The Centre of Forensic Sciences should establish a written policy on the form and content of reports issued by its analysts. The Centre should

draw upon the work done by forensic agencies elsewhere and the input of other stakeholders in the administration of criminal justice who will be receiving and acting upon these reports. In addition to other essential components, these reports must contain the conclusions drawn from the forensic testing and *the limitations to be placed upon those conclusions.*

Criticisms of CFS reports were advanced by several parties before the Commission. They were criticized for being structured in a way which favoured the prosecution's point of view. They were criticized for not including the limitations on the scientist's opinion. They were criticized for failing to articulate the background information received, the hypotheses which the test results were directed to and the significance of any findings reached.

For example, Dr. Robertson testified:

[T]hey don't seem to me, from the limited number I've seen, I have to say to really lay a foundation for why the exercise was undertaken in the first place, what the results, if you really like, actually add up to, and what sort of conclusions really can be safely drawn from them.

The inadequacy in forensic reporting is not an issue unique to the CFS. Dr. Blake testified that he has reviewed numerous DNA reports in the United States and frequently found them to be deficient in their ability to communicate findings effectively and accurately. Dr. Robertson testified that reports can be meaningless, shorthand versions which do not give enough information to indicate what was done, and which do not permit the reader to evaluate the work. Indeed, Dr. Robertson stated that it is not generally the technical testing that creates difficulties in a case, but rather what is said about the tests in reports and in court. I share that view, with particular reference to the *Morin* case. Having said that, I note Mr. Cook's evidence that the form of reports prepared by Ms. Nyznyk in the *Morin* case would not currently be acceptable at his laboratory in England, though they did meet forensic standards at the time.

In my view, the CFS must establish a clear written policy on the form and content of forensic reports. ASCLD/LAB says little about how reports should be written. Policies have been implemented in other jurisdictions. For example, Mr. Cook introduced me to the Forensic Science Service's "A Guide

to Writing Expert Witness Statements.” It not only articulates for its scientists how reports are to be written, it also notes that its scientists should “be prepared to justify any deviation from this to your checking officer or section manager.” CFS policy should contain similar language.

In formulating its written policy, the CFS should continue to draw upon the collective wisdom in other jurisdictions,⁶⁴ as well as the input of the various stakeholders in the administration of criminal justice in Ontario who must receive and rely upon these reports. I note that Dr. Robertson specifically endorsed the idea of stakeholders sitting down together and working out how reports should be structured in the particular jurisdiction. A clear and accurate forensic report undoubtedly will also obviate the necessity of *viva voce* evidence in a number of cases.

Dr. Tilstone testified about the policy in place at the South Australia Forensic Service:

There was a fairly lengthy policy on reporting, and that policy said that reports had to contain five following parts. They had to have a chain of custody which defined the items which were examined, and where they came from. They had to define the tests which were conducted. They had to specify the results of that testing. They had to specify the conclusions which could be drawn from the testing, and they had to specify the limitations which could be placed on those conclusions.

In regard to the conclusions and the limitations, the policy instructed staff to report in exclusionary terms, so the policy was always that findings should be interpreted from the point of view of what they excluded, the things that were not possible as a result of these findings. And the policy also required that they should state the limitations on non-exclusions.

However, the policy did not require that staff gave a list of all possible alternative explanations, and language such as other explanations were possible was accepted. And the view was that that simple language

⁶⁴ Dr. Tilstone testified that the NATA program in Australia contains provisions which speak to the issue of how reports should be written.

at least alerted the reader to the fact that there were, indeed, as it says, other explanations possible for these findings.

Dr. Blake essentially agreed with the South Australian model, but added that reports should include a fairly detailed statement of the hypothesis being tested and the reasoning process by which the conclusions were reached. Dr. Blake described the content of one of his DNA reports. He suggested that it was in a form which allowed for a critical review of whether the conclusions were supported by the data. It included:

- a background section, outlining the hypothesis being tested;
- an inventory of evidence, to deal with chain of evidence issues;
- a description of the evidence to be tested and what the preliminary evidence testing process involves;
- a description of the parts of the evidence where there is interesting biology, and how that biology is identified;
- a description of the various technical processes employed;
- the results and conclusions;
- tables of background information on gene frequency and summaries of the analytical data; and
- photographs of the exhibits.

Mr. Cook testified that reports at his laboratory are quite detailed. They outline the circumstances of the case and the information on which the scientist bases his or her interpretation. They also spell out the significance of any findings that were made. He stressed the need to itemize all exculpatory evidence in a report.

Dr. Robertson stated that the precise content of a report is a matter of detail, but the guiding principle should be that the report be candid and aimed at non-concealment. He explained that at his laboratory, an appendix is added to every hair and fibre report which, broadly speaking, “covers the protocol that’s used, the methodology, basically the approach, the thinking that goes into the hair examination and the comparison process.” He added that it is impossible, however, to address in a report every conceivable issue which might arise in the adversarial process. It is for that reason that he felt more pre-trial meetings should be held where all the issues can be canvassed (and possibly resolved). Such meetings would also give the scientists time in advance of trial to think about the issues. Dr. Blake agreed.

There were some differences between the approaches advocated by the various scientists to report-writing. For example, Mr. Cook and Dr. Blake favoured more detailed reports. Dr. Robertson and Dr. Tilstone (and the Centre) prefer ‘outline reports.’ In principle, there was consensus that, in the least, reports should accommodate the principles articulated by Dr. Tilstone.

Early at this Inquiry, Mr. Lucas agreed that the CFS should review how its reports are written, since their basic format has not changed in many years. He accepted that CFS reports might need to include more information about the limitations of the enumerated findings. Dr. Young, on behalf of the CFS, attended the panel discussion of forensic scientists and found it very helpful. He accepted that the CFS needs to change its report-writing style. He stated that the CFS has been examining the issue for several months, including the exclusionary model proposed by Dr. Tilstone. He had no difficulty with the most important suggestion, namely, the articulation of the limitations on the findings reached.

In its written submissions, the CFS indicated that it intends to adopt the five reporting requirements advocated by Dr. Tilstone. It said:

The reports will now include: (1) chain of custody; (2) definition of tests conducted; (3) results of tests conducted; (4) conclusions; (5) limitations on conclusions. In regard to the conclusions and the limitations, the CFS has been evolving toward the use of an exclusionary perspective, and intends now to require staff to write in exclusionary terms in appropriate cases. As stated by Dr. Tilstone:

[I]f I wrote a report for you that said they matched, then you're going to go away with one impression of the strength of that. And you probably might not even test it, whereas if I wrote a report that said: On the basis of the tests which I've enumerated and I used, I cannot exclude that these things had a common origin, but other explanations are possible, then I have alerted you to the limitations of my findings, and given you an easy way to test the strength of it. And we can then engage in a dialogue where we try to work out what the strength is.

The expression of limitations will not require a dissertation on all possible explanations for the results. It will be sufficient to note something to the effect that "other explanations are possible". The CFS does not believe that very lengthy reports, examples of which were provided to the Commissioner, are necessary, nor are they practical at an institution with the volume of work handled by the CFS.

The CFS also has adopted Dr. Robertson's recommendations in part:

[T]he CFS is developing standard written material which will describe the nature of tests conducted, including definitions of important terminology. This material will be provided to police, Crowns and defence and will be appended to reports as a matter of course.

The CFS is to be commended for its recognition of the problem and the initiatives described. However, there is one important aspect of this issue which I need further address. In its written submissions, the CFS also said this:

As for the written reports of the CFS in the Jessop case, the CFS does not accept any suggestion that they were inadequate or misleading. These reports stated that the fibres or hair "could have" come from a particular source, or were "similar to" that source, which are scientifically accurate conclusions. The position of the CFS is that the written report should contain only the scientific facts and conclusions, not

the factual inferences which can be drawn from them pertaining to a particular case. However, the scientist is always available to discuss the significance of findings in a particular case, with any party who requested such information. In addition, it must be noted that the CFS produced (and still does) a manual for police and Crowns, also available to the public, which discusses *inter alia* the significance of findings in respect of each type of testing. At the time of the Jessop case the manual, entitled "Laboratory Aids for the Investigator", stated respect to hair and fibre evidence, "It is not possible to establish that a hair definitely came from a specific individual".⁶⁵ One purpose of the "significance of findings" discussion is to ensure that the police and Crowns have a basic understanding of the science and an appreciation of its potential evidentiary significance.

With respect, this misconceives the problem. The real problem here was not that the scientists advised counsel in writing that, for example, the body site fibres definitely or conclusively came from Guy Paul Morin or that the necklace hair or the car hairs conclusively came from Guy Paul Morin or Christine Jessop. If the full extent of the scientists' conclusions had been that the fibre similarities may or may not be evidence of direct contact, but do not favour that inference over other possible inferences in all the circumstances (their present view), then the CFS' point would be well taken. The problem here was that the scientists expressed views as to the significance of, for example, the fibre comparisons in establishing direct contact, or the unlikelihood of environmental contamination or random occurrence. When these are the conclusions which the experts are prepared to swear to, they must make their way into a report. In other words, a report must reflect how the scientific work bears upon the hypotheses being tested. With respect, it is not sufficient that, arguably, the most important aspect of the scientists' opinions is not in the report, but that the scientists are available for discussion. Further, resort to the CFS manual does not address this problem.

In the context of the necklace hair comparison, I do not agree with the Centre's written submissions that the contents of Ms. Nyznyk's report dealing

⁶⁵ Exhibit 44B, p. 37. Today the guide states (Exhibit 44A, p. 57): "While it is possible to determine that a particular hair did *not* come from a particular individual, it cannot be conclusively stated that a hair came from a specific individual."

with this hair would be adequate by today's standards. In my view, articulation of the conclusions to be drawn and the limitations upon those conclusions should compel a report more closely akin to Mr. Erickson's letter to Mr. Scott dated March 28, 1990. As I previously indicated, I found that Mr. Erickson's letter clearly and accurately outlined the conclusions which could and could not be drawn from the necklace hair and the limitations upon those conclusions.

I also recognize that reports may have to be supplemented as the hypotheses to be tested become known to the analysts. Similarly, if the analyst expresses an opinion, for example, as to environmental contamination, he or she should briefly list the facts communicated to him or her upon which the opinion is based. I do not accept that such requirements would be unduly burdensome. Indeed, if the scientist expects to articulate these opinions in trial testimony, it follows that their documentation would facilitate the expression of opinions with accuracy and scientific rigour. Apart from the invalidity of the opinions expressed in the *Morin* case, I was struck by how loose and imprecise the testimony was. This was not merely a product of a difficult, subjective discipline, but of a fundamental lack of scientific rigour.

Recommendation 8: The use of appropriate forensic language

The Centre of Forensic Sciences should endeavour to establish a policy for the use of certain uniform language which is not potentially misleading and which enhances understanding. This policy should draw upon the work done by forensic agencies or working groups elsewhere and the input of other stakeholders in the administration of criminal justice. This policy should be made public.

I have already reflected in the context of my findings that scientists (within and outside the Centre) sometimes express the same conclusions in different terms. At other times, they express different conclusions using the same terms. Some of the terms, even if used uniformly, are potentially misleading.

The concern over the variable and confusing use of language was shared by several of the systemic witnesses who testified before me. Dr. Young said that it is very important to get past language difficulties so that the police can obtain and act upon correct information. I agree.

Dr. Blake agreed that it would be advisable for language to be standardized. He did note that it is inevitable that some scientists will use terms differently and that counsel need be alive to that concern and clarify the meaning of terms used. Dr. Robertson felt that more work should be done to formulate guidelines as to the best terms to use and their meanings. He thought that a glossary of terms would be useful.

Work is currently being done in the England and the United States on developing appropriate standardized terminology. Dr. Robertson testified that in the United States a working group called TWIGMAT (Technical Working Group for Material Sciences) has already developed some standards for fibre comparisons and is working on doing the same for hair comparisons. The CFS should draw upon the experience and conclusions of this group and others in order to establish its own policy regarding the uniform use of language which is not misleading. Dr. Robertson also thought it important for all the various stakeholders in the administration of justice to collectively examine terminology in order to understand and influence it. The Ontario Crown Attorneys' Association cautioned me that scientists ultimately must determine the language which best reflects what they have to say. The caution is a wise one. However, I concur with Dr. Robertson that, since the goal here is accurate, user-friendly language for use in a court setting, the Centre should work together with the other participants in the criminal justice system to formulate appropriate language.

I understand that some change has already occurred at the Centre to address the concerns expressed at this Inquiry as to the use of language. Again, it is my view that the written policies which are developed should be readily accessible to the public and the participants in the justice system.

Recommendation 9: Specific language to be avoided by forensic scientists

More specifically, certain language is demonstrably misleading in the context of certain forensic disciplines. The terms 'match' and 'consistent with' used in the context of forensic hair and fibre comparisons are examples of potentially misleading language. CFS employees should be instructed to avoid demonstrably misleading language.

There was a consensus that the terms 'match' and 'consistent with,' in the context of hair and fibre evidence, are potentially misleading.

At Mr. Morin's first trial, Ms. Nyznyk sometimes used the term 'match' to describe the hair and fibre comparisons which she made. Given the limitations upon the discipline, she agreed at the Inquiry that the term is not an appropriate one. Mr. Erickson agreed.

At Mr. Morin's second trial, Ms. Nyznyk and Mr. Erickson drew some distinction between an opinion that a hair is 'consistent with' originating from the same source and an opinion that a hair 'could have' originated from the same source. This distinction attributes some heightened significance to the former opinion.

Mr. Erickson testified before me that 'consistent with' means the hairs are consistent in all respects. This involves a one-to-one comparison if the comparison is between a known hair and a single unknown hair, or the same range of characteristics in several hairs if the comparison is between a known hair and a number of unknown hairs. Mr. Crocker testified that 'consistent with' means that an unknown hair is similar on a one-to-one basis with any given hair in the known sample. Ms. Nyznyk testified that 'consistent with' means that there is a match between all aspects of the hairs, although exact one-to-one correspondence is very rare. She added that there is no set number of similar characteristics which will elevate a finding of 'could have' to a finding of 'consistent with.'

Mr. Erickson and Ms. Nyznyk testified that, by comparison, 'could have' means that a hair *may or may not* have come from a particular source. Ms. Nyznyk stated that it is based on a finding where some of the features of the various hairs could not be compared. Mr. Crocker testified that it means there is a composite match, *i.e.* no single unknown hair shares all the same characteristics with a known hair, but all the characteristics of the unknown hair are present within the sample of known hairs.

Mr. Crocker referred to a third level of comparison. He stated that the lowest level of comparison is when a hair 'cannot be excluded' as originating from a particular source. It means that a scientist found only some (more than one) 'very good' similar characteristics in the unknown and known hairs.

It appears to me that some may use this term to reflect a weaker level of comparison than 'could have' originated from the same source; others use the terms interchangeably; and still others use the term 'cannot be excluded' as a preferable manner of expressing the same level of comparison, since it is

fairer to express conclusions in ‘exclusionary’ rather than ‘inclusionary’ terms.

All the witnesses testified that there are variations in the strength of a comparison within each level of comparison. Ms. Nyznyk testified that there is no statistical significance to the various levels of comparison. A higher level of comparison does not refer to a narrowing of the percentage of the population who (in addition to the accused) could be the donor of the relevant hairs or fibres, although one can narrow the population to some extent in hair comparisons by placing a person within a certain group (*e.g.* blonds). Mr. Erickson testified that a finding of ‘consistent with’ implies a greater likelihood that a hair or fibre came from a source than a finding of ‘could have.’ *He defined ‘consistent with’ to mean more than a possibility, but less than a probability.*

There was evidence before me that efforts have been made in the past to statistically quantify the likelihood that two compared hairs (for example, one from a known source such as the suspect and one located on the victim or at a crime scene) originated from the same source. There is no general acceptance in the forensic community that hair comparisons can be statistically quantified. Indeed, Mr. Crocker was the author of one article which demonstrated the flaws in such an approach. I am satisfied that, at present, the value of hair comparisons cannot be statistically quantified.

The difficulty with the term ‘match’ needs little elaboration by me. It overstates the connection between similar hairs or fibres. There are multiple difficulties presented by the use of the term ‘consistent with.’ First, some use the term interchangeably with ‘could have’ originated or ‘cannot be excluded’ as originating. The term is now shrouded in confusion. Indeed, one sees examples in the Morin transcript where the evidence of the hair and fibre comparisons is described as ‘consistent with,’ despite Mr. Erickson and Ms. Nyznyk’s evidence before me that there were no such levels of comparison in this case. The trial judge’s admissibility rulings, earlier noted, provide examples. Second, the term ‘consistent with’ may be used by forensic scientists in other disciplines to mean something different. For example, the jury heard testimony that Guy Paul Morin’s pocket knife was ‘consistent with’ the weapon which caused Christine Jessop’s death. I did not take from this evidence anything more than the fact that his knife, and countless others, could not be excluded. Third, to some, ‘consistent with’ in common parlance would extend to anything which is not inconsistent with (*i.e.* anything which cannot be excluded). Fourth, to some, ‘consistent with’ implies perfect or near

identity of two items. (They would undoubtedly be surprised to hear Mr. Erickson say at this Inquiry that ‘consistent with’ meant more than a possibility, *but less than a probability*.)

Bernard Robertson and G.A. Vignaux, in their book *Interpreting Evidence: Evaluating Forensic Science in the Courtroom*,⁶⁶ offer the following explanation of the difficulty with the term ‘consistent with’:

Worst of all is the word “consistent,” a word in (unfortunately) common use by forensic scientists, pathologists and lawyers. To a scientist, and to a dictionary, “consistent with” is simply the opposite of “inconsistent with.” The definition of “inconsistent” is precise and narrow. Two events are inconsistent with one another if they cannot possibly occur together. Thus, a person cannot be in two different places at the same instant and so evidence that he was in New York at a particular instant is inconsistent with the proposition that he was in London at the same instant. Anything which is not inconsistent is consistent. Thus, the proposition ‘several murders were committed in New York today’ is quite consistent with the proposition ‘it rained in London today,’ although it may be irrelevant.

Unfortunately for clear communication, Craddock, Lamb and Moffat found that lawyers usually interpret “consistent with” as meaning “reasonably strongly supporting,” while scientists use it in its strict logical and neutral meaning. When a pathologist says that certain injuries are “consistent” with a road accident there is no implication about whether or not there has been a road accident. It is possible that the injuries could occur given the circumstances that have been described. It is therefore perfectly sensible to say that something is “consistent but unlikely.” If there is some genuine dispute about the cause of the injuries what would the pathologist be able to say? He might say that the injuries were consistent with either an assault or a road accident but are more likely to have occurred if there had been an assault than if there had been a road accident. If they are equally consistent with both then they do not help us decide which of them occurred.

⁶⁶ Chichester: John Wiley and Sons, 1995, at 56.

The comments of Judy Bourke, in her article on misapplied science,⁶⁷ are also apposite:

The risk in asserting results are similar or consistent is in the effect it creates on the minds of the jury, counsel and judges. 'No dissimilarities' or 'not inconsistent with' are effectively the same as 'similar to' or 'consistent with'. The scientific connotation in these expressions is limited, but a jury cannot be 'expected [to] be attuned to the scientific nuances'.

Mr. Erickson and Ms. Nyznyk both testified at Mr. Morin's second trial that the various hairs and fibres "could have" come from the various sources. It is interesting to note in this context that the trial judge lapsed into the error of describing the hair and fibre 'matches' as follows:

Once again, please bear in mind "match" was used to mean consistent with having come from the same source. It does not mean that the two fibres or the two hairs, as the case may be, conclusively did originate from the same source.

There was also agreement amongst the systemic witnesses before the Commission that use of the terms 'match' and 'consistent with' are inappropriate when describing hair and fibre comparisons. Dr. Tilstone testified that different people ascribe different meanings to the terms. Dr. Blake thought that the terms are misleading and confusing, explaining that even DNA analysis does not prove that two things are identical.⁶⁸ Dr. Tilstone felt that if a scientist does not have a database which allows him to express quantitative information, he should avoid language which implies some quantitative rarity.

In its written submissions, the Centre said this:

It is further acknowledged that the use of the terms "match" and "consistent with" by both Ms. Nyznyk and

⁶⁷ Judy Bourke, "Misapplied Science: Unreliability in Scientific Test Evidence" Parts I and II, (1993) 10 Aust. Bar Rev. 123 at 188.

⁶⁸ I do not wish to comment on the appropriateness of the term 'match' in the context of highly discriminating DNA analysis. The issue is not before me.

Mr. Erickson may have been confusing. With respect to the word "match", this has never been used in CFS trace evidence reports because it is scientifically inaccurate. For the same reason, it should also be avoided in a court of law (as stated by Mr. Erickson in his testimony before the Inquiry).⁶⁹ With respect to the term "consistent with", although it does have a distinct scientific meaning in hair and fibre analysis and is regularly used among scientists, repeated use of the use of the term among non-scientists may create a mistaken impression if the meaning of the terms is not adequately emphasized.

Dr. Young testified that both terms have been eliminated from the CFS vocabulary in the context of subjective examinations like hair and fibre comparisons. This is a commendable development.

Recommendation 10: Specific language to be adopted

The previous recommendation addresses the avoidance of specific language which is potentially misleading. This recommendation encourages the use of specific language which enhances understanding.

Certain language enhances understanding and more clearly reflects the limitations upon scientific findings. For example, some scientists state that an item ‘may or may not’ have originated from a particular person or object. This language is preferable to a statement that an item ‘could have’ originated from that person or object, not only because the limitations are clearer, but also because the same conclusion is expressed in more neutral terms.

Drs. Tilstone and Robertson testified that scientific language has historically been constructed from an inclusionary perspective. They suggested

⁶⁹ The Centre also said that “[i]t is significant to note that the word ‘match’ was used regularly in its colloquial sense by parties at the Inquiry. The implication, clearly, is that the word may be used as a helpful shorthand without jeopardizing the mutual understanding that it is scientifically inaccurate. While this does not suggest that use of the word ‘match’ is advisable in Court, it does demonstrate that the word is not necessarily misleading.” This observation is a valid one. Indeed, I have used the term myself earlier in this chapter in connection with the Jackson and Cook study, since Mr. Cook and others used the term extensively, but with appropriate qualifications.

that it be reconstructed from an exclusionary perspective, so that scientists state their conclusions in terms of their ability to exclude rather than their ability to include. As noted earlier, the Centre has indicated in its written submissions that it “has been evolving toward the use of an exclusionary perspective, and intends now to require staff to write in exclusionary terms in appropriate cases.” I support this approach.

Dr. Tilstone also felt that scientists should state their conclusions in everyday language, avoiding terms that are not clearly defined. Dr. Robertson agreed, citing the following statement from the Splatt Commission in Australia:

The vital obligation which lies upon the testifying scientist is that they spell out to the jury in non-ambiguous and precisely clear terms the degree of weight, and substance, and significance which is or ought to be properly attached to the scientific tests, analysis, and examination as to which they dispose, and specifically, the nature and degree of any limitations.

I have earlier said that reports must reflect the limitations upon the scientists’ findings. Whether reflected in reports or in testimony, scientists must use language which clearly reflects these limitations. For this reason, terms like ‘could have come from a particular source,’ although they contemplate the opposite, should be rejected in favour of language which more explicitly highlights the full implications of a scientific finding. Dr. Tilstone suggested describing hair comparisons in terms like “I cannot exclude that these things had a common origin, but other explanations are possible.”

He said:

You should say: I have viewed the following tests, and I cannot exclude that these came from the same source. But you're going to have to qualify it. if I wrote a report that said: On the basis of the tests which I've enumerate and I used, I cannot exclude that these things had a common origin, but other explanations are possible, then I have alerted you to the limitations of my findings, and given you an easy way to test the strength of it. And we can then engage in a dialogue where we try to work out what the strength is.

Recommendation 11: The scientific method

The ‘scientific method’ means that scientists are to work to vigorously challenge or disprove a hypothesis, rather than to prove one. Forensic scientists at the Centre should be instructed to adopt this approach, particularly in connection with a hypothesis that a suspect or accused is forensically linked to the crime.

The comments of author Judy Bourke again bear repeating:

Scientific testing ‘should be a search for dissimilarities, not for similarities.’ It is a scientific principle that tests be ‘designed to disprove the original assumption’ of the accused’s guilt, that is, to exclude the suspect. The risk in testing for a pattern of similarities is that it implies the assumption of guilt is correct. This strengthens the implication of the common origin of crime scene samples to the suspect. The *Shannon Report* referred to this risk of heightened assumption and stronger implication as ‘unconscious bias’.

Ordinarily, the hypothesis being tested (explicitly or implicitly) in the hair and fibre unit is whether the trace evidence connects the accused to the crime. In the *Morin* case, the hypothesis was, more specifically, that the trace evidence linked Christine Jessop to the Morin Honda or that the trace evidence linked Guy Paul Morin to the body site.

The submissions on behalf of the Morins dealt with this point:

Tilstone explained that in response to the *Splatt* Commission in Australia, there were a number of policies enacted to attempt to achieve both impartiality and independence in the newly established Forensic Science Services. Scientists are required ‘to report in exclusionary terms’ and ‘findings should be interpreted from the point of view of what they excluded, the things that were not possible as a result of these findings’. As regards non-exclusions, the limitations must be clearly stated. These requirements are in accordance with sound scientific principles, he said. Tilstone further testified:

Science since Newton has been a matter of postulating a hypothesis and testing it. ...the principal scientific ethic — and I think ethic is a good word for it — is that the testing has to be a rigorous challenge to the hypothesis, specifically designed to do everything possible to disprove it. And if you don't disprove it, then you're left with something that you accept for the time being.

Now that simple situation needs two further — well, one further qualification with two points to it, and that is that the strength of the belief that you're left with depends on firstly how common or uncommon the hypothesis is. And secondly, it depends on the strength of the scientific processes or procedures that you've used to challenge the hypothesis. So if we postulate a hypothesis of something that's everyday, and we test it by something that's everyday, then we're not going to disprove it. And really, we're not left with anything that's very compelling.

If, however, we challenge it with very discrimination techniques, and it fails to disprove it, then we are left with something that's compelling”

Drs. Robertson and Blake agreed. Blake testified:

I think that it is perfectly appropriate and arguably necessary for the forensic scientist to have some idea of the investigative theory. It is the investigative theory that is the hypothesis to be tested.

[A]nd the way that one goes about testing the hypothesis is, as Dr. Tilstone said yesterday, employing whatever appropriate procedures are available to disprove the hypothesis if it is wrong.”

All of the scientists agreed that testing according to the investigative theory is valid and appropriate, but that the quality of the results achieved and their significance is dependent upon using every available legitimate scientific means to *disprove* the investigative theory. Tilstone summed this up concisely:

[W]e're distinguishing two very important things in this discussion. One is the quality of the hypothesis which is formulated and tested, and the other one is the quality of the procedures that are put in place to perform that testing.

Dr. Tilstone applied this approach to hair and fibre conclusions:

If you look at it in regard to your prompting about hairs and fibres, an example of an illustration that I've used in documents which we have, is that if a lab finds no differences in two sets of fibres, one recovered from person A, and the other recovered from person B, the conclusions that can be drawn from that can be extremely limited. And in particular, the question has to be posited: Is this fibre material there because of secondary transfer. In other words, did it come because both person A and person B had been in contact with some third common source?

And very often, the answer to that is, it depends on the numbers of recovered fibres, and people will say if you find a lot of fibres, it must have come from primary contact, and if you find very few, it must have come from secondary contact. And I think some people would use most. Now I don't believe that that's good science, because I don't know of any way you can challenge that hypothesis and say there is a certain number of fibres above which it's primary contact, and below which it must be secondary contact. And I'm using secondary contact deliberately rather than contamination. It could have been some kind of legitimate situation.

In my view, the submissions on behalf of the Morins (expressed in similar terms by AIDWYC) are sound. The scientists who testified during the systemic stage of the Inquiry supported this approach. Put succinctly, it serves to remind the forensic scientist that science bears the burden of demonstrating that reliable conclusions can be drawn from the available data. In the context of the *Morin* case, a vigorous effort to challenge the hypothesis that the trace evidence connected Christine Jessop and Guy Paul Morin would, perhaps, have been more likely to yield the right result — namely, that the hypothesis cannot be shown or even favoured over other conclusions — than an approach which looked for evidence which tended to support the hypothesis

that Christine Jessop and Guy Paul Morin were connected. This recommendation complements the suggestions earlier made that conclusions be reported, where possible, in exclusionary rather than inclusionary terms.

Recommendation 12: Policy respecting correction of misinterpreted forensic evidence

A forensic scientist may leave the witness stand concerned that his or her evidence is being misinterpreted or that a misperception has been left about the conclusions which can be drawn or the limitations upon those conclusions. An obligation should be placed on the expert to ensure that these concerns are communicated as soon as possible to Crown or defence counsel. Where communicated to Crown counsel, an immediate disclosure obligation is triggered. The Crown Policy Manual and the Centre's policies should be amended to reflect these obligations. The Centre's employees should be trained to adhere to this policy.

Several of the scientists who testified before me expressed concern that the adversarial system sometimes inhibited them from ensuring that their opinions were fully and accurately communicated and understood. Though I did not accept Ms. Nyznyk's evidence that this explains why her trial evidence was different from her Inquiry evidence, it is a legitimate concern. Mr. Cook indicated that there are occasions when experts may feel uncomfortable because the true strength or weakness of their evidence is not being conveyed to the court.

Similar concerns prompted the Runciman Commission to make the following recommendation:

Recommendation 298:

Where expert evidence is disputed, the trial judge should ask expert witnesses before they leave the witness box whether there is anything else that they wish to say. The question should be put in the absence of the jury but, if the evidence is admissible, it should then be put before the jury.

Dr. Young testified that he had no difficulty with this recommendation. Messrs. Cook and Lucas similarly approved of it. Mr. Lucas and Sarah Welch, President of the Ontario Crown Attorneys' Association and

a senior prosecutor, cautioned, however, that a biased scientist might use the opportunity to advocate a particular position. David Butt, an appellate Crown attorney with the Ministry of the Attorney General, suggested an alternative approach:

I don't think a mandatory requirement that at the end of any particular witness, a judge has to recite something in the nature of a Brydges' card: Is there anything else you wish to add, is necessarily going to be terribly helpful. What I do support is this: When one is presenting expert evidence, one is obviously, by the very nature of the evidence going before the jury dealing with something that's beyond the ability of the ordinary person to understand him or herself. The expert is there fulfil an educational need that's critical to the forensic process that the jury is engaged in.

The judge, in my view, should be watching the examination in-chief and the cross-examination with a very different eye than the parties are. They're advancing their — vigorously advancing their opposing perspectives on things. The judge should be looking at this from an educational perspective, and saying: Is the jury getting the information that they need? In other words, is the jury getting an accurate picture of the science here?

And if, for example, a judge feels, through observation, careful observation, careful listening, that an examination in-chief is perhaps too tightly controlled and perceives some frustration on the part of the expert, or in the cross-examination, again, the same kind of overly stringent control that the judge senses some frustration in the expert or some inability to get a point across that the judge perceives is critical, by all means, at the end of either — I would think at the end of the cross-examination is probably the best point.

But the judge should have, within the traditional limits of judicial questioning the opportunity to address the witness him or herself, and say: Now I sense that you didn't quite say everything that you wanted to say in relation to area x, or in relation to area y. The science has to be given its full and legitimate strength if it's going to aid the truth-seeking process, and if the judge sense, during the course of its presentation in-chief or

in cross, and I don't care who's calling the scientist, that that's not been done, the judge, I think, has a duty to step in and ask again, the context-specific questions that are going to fulfil that education objective.

Bruce Durno, a senior defence counsel and former President of the Criminal Lawyers' Association, preferred that the onus be on the testifying scientist:

While I appreciate Mr. Butt's comments about the trial judge's observations, scientists and expert witnesses are coming in to assist the trier of fact, who often is the judge, with an area outside of their field of expertise. It may very well be that the evidence has been presented in the wrong light because of questioning, and the judge may not realize it. So I'm very much in favour of having an onus on the scientist at the end, in the absence of the jury, to ask the questions. Is there a problem with the way in which your evidence has been presented, given the question?

Ms. Welch agreed that the obligation should fall upon the scientist.

The new Crown policy, largely reproduced earlier, does address this issue. The relevant portion bears repetition:

It is important to ensure that experts understand that, if at the end of their testimony they are concerned that a misleading impression of their evidence has been left with the triers of fact, they should relay that concern to the officer-in-charge as soon as possible. The information given to the officer by the scientist triggers an immediate disclosure obligation to the defence. Counsel should be aware that scientists from the Centre of Forensic Sciences are alive to this obligation.

Mr. Baig, an experienced, senior defence counsel, thought that scientists should report their concerns to Crown counsel and not the police. Mr. Griffiths, one of the architects of the policy, felt that the relationship between a witness and the police, the prosecutor's time constraints and the concern that prosecutors not become witnesses at trial, explain the policy.

In its written submissions, the Criminal Lawyers' Association argued:

The policy directing that a scientist notify the officer-in-charge of the case if he/she feels his/her evidence has been misinterpreted is unacceptable. All parties including the defence should be so informed. The scientist, if truly objective, has an ethical obligation to inform the person affected by the misinterpretation. It was asserted that the employees of the Centre are completely accessible to the defence before trial. They are more than willing to discuss all aspects of their proposed evidence and its interpretation. If this is truly the case, they should be equally available to correct misunderstandings after giving evidence.

My views are as follows. First, I do not support the mandated questioning of each witness by the trial judge as he or she leaves the witness box. I agree with Mr. Butt that the trial judge always has the discretion to intervene where the testimony is confusing or the witness has obviously been cut off through an overly controlling approach. Otherwise, the onus should rest with the expert to correct testimony. Second, although the Crown Policy Manual is generally acceptable, it would be preferable that the expert, where practicable, rectify the matter through Crown counsel. In this situation, Crown counsel will likely be readily accessible. He or she will have to address the concerns in any event. In some cases, the officer-in-charge is not present. He or she may not fully appreciate the concerns being expressed, in the same way as Crown counsel will, having called the evidence. Crown counsel are often more fully conversant with the disclosure obligations flowing from the expert's concerns. Crown counsel can involve the officer-in-charge in any event and, in limited circumstances, may be compelled to do so: for example, where the expert makes an allegation that might realistically make the prosecutor a potential witness.

Recommendation 13: Policy respecting documentation of contacts with third parties

(a) The Centre of Forensic Sciences should establish a written policy requiring its analysts and technicians to record the substance of their contacts with police, prosecutors, defence counsel and non-Centre experts. This policy should regulate the form, content, preservation and storage of such records. Where such records are referable to the work done on a criminal case, they must be located within the file(s) respecting that criminal case (or their location clearly noted in that file).

(b) The Centre of Forensic Sciences should ensure that all employees are trained to comply with the recording policies.

In the *Morin* case, inadequate records were kept by CFS employees of their contacts with police, prosecutors and defence counsel. Ms. Nyznyk's failure to record her communications with investigators is such an example. Ms. Nyznyk and Mr. Erickson also failed to record the substance of any conversations with Crown counsel, although they repeatedly met with Crown counsel and investigators prior to the second trial. The failure to record anything about those meetings obviously inhibited any accurate account by them at this Inquiry of what they told the prosecutors in those meetings. More important, it inhibited an informed evaluation of their evidence prior to and during the trial. For example, the defence alleged at trial that the fibre similarities could be explained by environmental contamination. There was conflicting evidence at trial bearing upon the extent of contact (that is, the opportunity for environmental contamination) between the Jessops and Morins. It is impossible to ascertain from the existing documentation precisely what Crown counsel told the CFS experts on this issue and, accordingly, it becomes that much more difficult to ascertain what underlying factual assumptions prompted their evidence that environmental contamination was unlikely. One should expect CFS experts to record the factual assumptions or hypotheticals which are provided them, together with a summary of their opinions expressed in conversations with prosecutors, investigators and defence counsel. The existence of such documentation would also facilitate the preparation of supplementary reports, if required.

Mr. Lucas supported the idea of scientists keeping a record of their contacts with outside parties. Mr. Cook testified that the Forensic Science Service requires that all information given to a scientist be recorded. Dr. Robertson testified that a similar policy is in effect at his laboratory in South Australia:

[A]s far as protocols go, yes, any conversation between a submitting officer and the person receiving the case or subsequent contact is recorded in the case file, and that conversation took place. And if there's anything substantive to the conversation, as I say, the essence of it is captured on the case file, as far as the police officers themselves is concerned.

.....

[I]n the Australia Federal Police, we have a case submission, or case management system where the officers put in a quite volume ... of sometimes description of their involvement of the case. And what encourages them to do that is that, is that is in fact what's used to evaluate, if you like, their work load so that it encourages them to put quite a lot of information in, and we get copies of that, and that goes on file as well.

I was advised that CFS scientists are now required to record in a 'conversation log' all communications with police, Crown attorneys and defence counsel. This log is subject to disclosure. Dr. Young acknowledged that the CFS has been somewhat vague about how specific its content should be, but stated that, recently, scientists have been advised to include more detail. This requirement should be reflected in the Centre's written policies, together with a preamble which explains to the scientists, in terms similar to those which I have articulated above, the kinds of things which must be recorded and why.

Recommendation 14: Policy respecting documentation of work performed

(a) The Centre of Forensic Sciences should establish written policies regulating the content of records kept by analysts and technicians of the work done at the Centre. In the least, these policies must ensure that the records identify the precise work done, when it was done, by whom it was done and the identity of any others who assisted, or were present as observers when the work was performed. The policy should also regulate the retention period and location of these records. All records referable to the work done on a criminal case must be located within the file(s) respecting that criminal case (or their location clearly noted in that file).

(b) The Centre of Forensic Sciences should ensure that all employees are trained to comply with the recording policies.

In the *Morin* case, seriously inadequate records were kept of the work done on the file. Notes were unorganized. No cohesive way of recording data was apparent. It would be difficult for any scientist to reconstruct precisely what Ms. Nyznyk did and when she did it based upon her records. The records often failed to disclose who conducted tapings or vacuumings.

Witnesses could not confidently tell me whether they were involved or not in various activities.

The Centre has acknowledged the problem. The written submissions on behalf of the CFS say this:

- Changes to documentation requirements since the mid-80's are intended to enable anyone reviewing the file to have, as much as possible, a complete picture of all work done. These changes include the following:
 - (a) Technicians are not only required to take extensive notes of their work, but these notes must now always retained in the files. In contrast to the mid-80's, technicians are also now required to document continuity.
 - (b) The trace unit has adopted a new set of forms for work notes, the objective of which is to standardize and maximize the quality of the information recorded. The new forms are presently being utilized on a trial basis, pending feedback from the staff.
 - (c) Logs are now kept of all calibration and maintenance of instruments.

I support these changes. My recommendation is intended to complement those changes in several respects.

Recommendation 15: Documentation of Contamination

(a) Where in-house contamination is discovered or suspected by the Centre of Forensic Sciences, the contamination should be fully investigated in a timely manner. The contamination and its investigation should be fully documented. A copy of such documentation should be placed in any case file to which the contamination may relate. The matter should immediately be brought to the attention of the Director, the Quality Assurance Unit and the relevant Crown counsel. The Centre's written policies should reflect these requirements.

(b) The Centre of Forensic Sciences should also reflect, in its written policies, the protocols to be followed by its employees to *prevent* the contamination of original evidence.

(c) The Centre of Forensic Sciences should ensure that its employees are regularly trained to comply with the policies reflected in this recommendation.

Contamination is a serious event in trace analysis, affecting the integrity of any findings. Any evidence of contamination must be recorded in order to allow for later independent review. In addition, the potential causes of contamination must be fully investigated. Contamination in a case may not be an isolated event. It may have affected other cases, or may do so in the future. Mr. Erickson and Ms. Nyznyk failed to properly investigate the contamination in Mr. Morin's case, and thus we can never know whether it affected any other cases, or indeed the Morin findings themselves.

The Centre's written submissions reflect the current safeguards said to protect against contamination:

The hair and fibre unit has been physically rebuilt in recent years and a variety of measures have been implemented with a specific view to minimizing the risk of contamination within the CFS. In their travels to other hair and fibre facilities during 1997, Dr. Prime (CFS Director) and Dr. Young found that existing CFS hair and fibre facilities and standards compared very favourably with those observed.

The physical facilities of the hair and fibre unit have been changed in the following manner:

- □ There are now two separate taping rooms
- The taping rooms are separate from other examination rooms
- The physical design permits only minimum passage of personnel through taping rooms
- □ There is a completely new ventilation system

The procedures now in place to prevent contamination are the following:

- No trace examinations are conducted on items that have been examined in another section of the CFS (i.e. trace examinations are done first or not at all)
- Taping rooms are blocked off completely during the taping process
- Any person taping an item must also do a taping of their own clothes, which taping is to be kept with the other material from the case
- Only the person or persons doing the taping are permitted in the examination room
- Disposable lab coats are now used instead of cloth coats
- □ A different lab coat is used for each taping

In addition, as a general rule, students and any other untrained personnel are not allowed access to exhibit materials, and training materials now emphasize the issue of contamination.

These procedures should be in writing and provided to all Centre employees. Though these procedures are more stringent than those in existence during the Morin proceedings, one must observe that many were said to be in effect back then — for example, the use of laboratory coats. The evidence before me suggested that the policies were not always honoured by employees. I expect that the Centre's employees are now acutely aware of the dangers of contamination. However, ongoing, regular training must ensure that these employees remain vigilant in this regard well after this Inquiry has concluded.

Recommendation 16: Documentation of Lost Evidence

Where original evidence in the possession of the Centre of Forensic Sciences is lost, the loss should be fully investigated in a timely manner. The loss and its investigation should be fully documented. A copy of such documentation should be placed in any case file to which the original evidence relates. The matter should immediately be brought to the

attention of the Director, the Quality Assurance Unit and the relevant Crown counsel. The Centre's written policies should reflect these requirements. In this context, original evidence extends to work notes, communication logs or other material which is subject to disclosure.

As indicated above, a number of items of evidence in Mr. Morin's case were lost at the CFS before the second trial: four hairs, some of Ms. Nyznyk's work notes and work sheets, two bones and all the 150-200 hair and fibre slides that were not made exhibits at the first trial (which included any slides made by Ms. Stefak in her 1985/1986 re-examination). The prosecution was not advised of these losses in a timely way.

As part of the funding provided to implement recommendations contained in the *Bernardo Investigation Review* (the Campbell Report),⁷⁰ the CFS will receive in 1998 a new computer system for tracking evidence within the CFS. Each item submitted to the CFS will be bar-coded, and certain data, including movement of an item from one person to another within the CFS, and the creation of sub-items (*e.g.* slides from fibre tapings), will be recorded in a computer file. For each case, the computer will be able to generate a list of the items submitted, and the status of that item within the CFS. The location of preserved evidence will be recorded in the system, as well as its disposition. I am satisfied that the loss of original evidence in this case will be addressed through the introduction of computerized tracking of original evidence and its location.

Recommendation 17: Reciprocal disclosure

Reciprocal disclosure of expert evidence should be established. The defence should be obliged to disclose to the Crown in a timely manner the names of any expert witnesses it intends to call as witnesses, along with an outline of the witnesses' evidence.

Subject to very limited exceptions, a criminal defendant in Canada is not currently subject to any disclosure obligations. The Crown, on the other hand, has broad disclosure obligations, which include the obligation to disclose all material it proposes to use at trial and all evidence which may

⁷⁰ The relevance of the Campbell Report to the issues at this Inquiry is discussed later in this Report.

assist the accused even if the Crown does not propose to adduce it: *R. v. Stinchcombe*.⁷¹ The important differences between the obligations of the Crown and the defence to disclose are said to be rooted (at least partly) in the different roles played by each. The defence assumes an entirely adversarial position towards the prosecution. The Crown has an overriding duty to ensure that justice is done.

Expert evidence is frequently technical and complex. Crown attorneys understandably often require the assistance of other experts in order to properly respond to expert evidence called by the defence. The tendering of previously undisclosed expert evidence can lead to undesirable delays in trials. Dr. Young lamented the “mad scramble” that occurs once the Crown at a trial learns what the defence expert has to say. He testified:

I don't think that makes for good justice, when things are being done on the fly, and they are being done without proper planning or discussion. If we're to assume that science is impartial, then there's no reason not to discuss, and in advance, to in fact know what's going to happen.

Some of the witnesses also commented on the unfairness involved in allowing the defence to hide its expert evidence from the Crown. Dr. Blake, for example, thought that it unfair for the defence to obtain a different opinion concerning the “fundamental analytical information associated with the evidence in a case” and then sit on it, waiting to ambush the other side at trial. He suggested that this undermines public confidence in the legal process.

The Ontario Crown Attorneys' Association and the CFS have recommended that reciprocal disclosure of expert evidence be established for criminal proceedings. In my view, mandated disclosure by the defence of expert evidence should be legislated. I should be clear that there are compelling policy reasons why reciprocal disclosure (pertaining, for example, to non-expert evidence) should not be mandated generally. That broader issue is not raised before me and, accordingly, is not further addressed.

As well, reciprocal disclosure of expert evidence should be mandated only for evidence which the defence intends to call at trial. A rule which

⁷¹ (1992), 68 C.C.C. (3d) 1 (S.C.C.).

would extend to the disclosure of any expert evidence available to the defence (but which the defence does not intend to lead) may be superficially attractive. However, defence counsel serves his or her client in an adversarial setting. The compelled disclosure of harmful expert opinions to the Crown would undermine the solicitor-client relationship and, equally important, inhibit defence counsel in investigating the forensic issues at trial. If defence counsel knew that the results of their forensic investigation need be disclosed to the Crown, it is likely that they would frequently forego such investigation due to the uncertainty of the results and out of fear that they could thereby fortify the case against the defendant. It is my view that disclosure of expert evidence which the defence intends to tender strikes the appropriate balance.

Such a recommendation was supported by the scientists who testified during the systemic phase. This is not surprising, since they understand the adversarial system, but regard their role as non-adversarial. Reciprocal disclosure enables scientists called by both sides to fully evaluate the scientific findings to be tendered at trial. Not surprisingly, perhaps, the recommendation was overwhelming supported by the prosecutors who responded to a survey circulated at the instance of the Ontario Crown Attorneys' Association (and supported by the Association itself). In my view, there are no constitutional or legal impediments to reciprocal disclosure of expert evidence, and compelling policy reasons in its favour.

The Runciman Report supported a system of reciprocal disclosure. However, its recommendations extended far beyond the more modest proposal I have made. Viscount Runciman's recommendations 287-292 read:

287. There should be pre-trial discussion between the two sides, not necessarily by way of a hearing, in all cases in which scientific evidence is being led, whether by the prosecution or by the defence.
288. If the defence intend to dispute the prosecution's scientific or other expert evidence, they should give advance notice of the grounds on which they dispute that evidence, whether or not they intend to call expert evidence of their own.
289. Where the defence are calling their own expert evidence, the expert witnesses on both sides should be required to meet in order to draw up a report of the scientific facts and their interpretation by both sides.

The document should be available to be put to the court as a written account of what has been agreed or remains in dispute. Where substantial disagreement on the scientific evidence is recorded in the report, a preparatory hearing should normally be arranged.

290. Where the defence do not dispute the prosecution scientific evidence, they should indicate this when counsel for both sides certify that they have discussed the case between them and notify the agreement, or lack of it, that they have reached on the issues.
291. Where the defence intend to dispute the evidence but not call expert evidence they should, after disclosure of the prosecution's expert evidence, indicate which matters in that evidence are admitted, which are not admitted, and when they are not admitted, in which respects.
292. Where the prosecution are not proposing to lead any expert evidence but the defence wish to call such evidence, the prosecution should be under the same obligations as the defence would be in the reverse situation.

Dr. Young felt that discussion of the scientific issues in advance of trial leads to better science. Otherwise, a scientist may go to court and learn something from the defence that would have altered his original evidence. He also suggested that reciprocal disclosure would help eliminate the issue of systemic bias:

I think it takes us out of the adversarial system, and it puts us where we should be as experts. Discussing with other experts and agreeing that honest disagreements can take place. So that I believe you tone down the problems and eliminate a lot of the risks with that move. And I realize it's a bold move, but I think it's one that, if we're serious about bias, it would go a long way in helping everybody.

And I think the relationships between the defence Bar and the scientists, if there are problems, would improve with that kind of a relationship where in fact, there was just a full and frank discussion ahead of time about what does the science mean, and we were cast in a much more neutral role. We don't enjoy the

adversarial role.

Much has been written about the nature and scope of reciprocal disclosure. A variety of reciprocal disclosure regimes exist throughout the world, some extending to defence evidence generally. This Inquiry devoted very little time to the issue and virtually no time to the recommendations contained in the Runciman Report, which, if implemented in Canada, would represent a fundamental change to the criminal justice system. In my view, reciprocal disclosure, to the degree proposed by me, would complement the present justice system. The merits of more extended changes in this area are beyond the scope of this Inquiry.

Recommendation 18: Joint education on forensic issues

The Centre of Forensic Sciences, the Criminal Lawyers' Association, the Ontario Crown Attorneys' Association and the Ministry of the Attorney General should establish some joint educational programming on forensic issues to enhance understanding of the forensic issues and better communication, liaison and understanding between the parties. The Government of Ontario should provide funding assistance to enable this programming.

The substance of this recommendation was supported by a number of parties at this Inquiry. There is an obvious need for Crown and defence counsel to be better educated on forensic issues.

Mr. Lucas testified that the CFS has repeatedly received demands from both the Crown and the defence bar for more training on forensic issues. At the same time, he acknowledged that the CFS has not always been able to meet those demands because of its limited resources and available personnel. The backlog of case work has always been a very significant issue in any decision on the use of staffing.

Dr. Young testified that the CFS recognizes the need for greater education in forensic issues. He added that the Centre is currently taking steps to address the problem. It is considering how it could fund a forensic course at Crown school, and is beginning to develop training programs and seminars for the defence. Dr. Young pointed out, however, that training programs require funding and take away from the time forensic scientists have to conduct the ever-increasing amount of case work. This is one reason that the

Ontario government need provide adequate funding for educational programs. I more fully address resource issues later in this Report.

However, joint programming is intended to address another issue. There is an obvious need for forensic scientists at the Centre to be better educated on the respective roles of Crown and defence counsel, and the criminal justice system. Joint programming must involve the Centre's scientists, sometimes as *lecturers* and sometimes as *registrants*. The Centre needs to foster a culture of independence and impartiality. Several scientists spoke to this issue at the Inquiry. Roger Cook described this culture as something that has "grown up" with his organization, the Forensic Science Service in England, and "is held as being extremely important." This culture permits scientists to "look at both sides, and draw conclusions, which may well help the defence in one case, the prosecution in another, or neither in another." This culture does not inhibit a scientist from saying things out of concern that they may harm the prosecution's case. Dr. Tilstone described the importance of dialogue as also fostering the perception of independence and impartiality:

A. It's absolutely natural that a situation where the forensic science services are delivered from an organisation that's doing all or almost all of its work on the instructions of the police or the prosecuting authorities would have that image in the mind of the defence Bar.

And correcting the image really requires a dialogue between the defence Bar and the laboratory to see if they can develop jointly some agreed way that things are done that helps to address the image. So therefore, when it breaks down, that really just becomes an extreme example of the generic situation.

Q. So the solution for both situations is essentially to talk?

A. It's absolutely to talk. It's a dialogue, it's an understanding, it's a: What can we give, as opposed to: What can we take in the sense of working together to address the issue? But really, if it breaks down in the way that you have described, it's going to be impossible to resolve unilaterally. There is nothing I can see that the lab could do in a unilateral sense that would

address the breakdown in confidence, because it's a question of trust. It's not a question of anything that's necessarily objective and procedural, and therefore capable of one-sided correction.

It follows that joint programming can reduce barriers and enhance understanding and trust between the parties. It also follows that this recommendation should not be seen as inhibiting joint programming between only some of the relevant parties: for example, a program involving the Centre of Forensic Sciences and the Criminal Lawyers' Association (whose level of mistrust is at its highest) may specifically address defence-related issues.

Finally, I wish to add that the development of training programs and seminars by the Centre for the defence should directly involve input from the defence bar at the earliest opportunity. A concern raised at this Inquiry by the Criminal Lawyers' Association in the context of various suggestions by Dr. Young was that the defence has had little or no input in proposed policies which directly relate to the defence bar. Whether through defence participation in the recommended advisory board (discussed below) or through organizations such as the Criminal Lawyers' Association (or as I suggest, through both), the CFS should directly involve the defence bar in a number of the issues raised here.

Recommendation 19: Creation of an Advisory Board to the Centre of Forensic Sciences

An advisory board to the Centre of Forensic Sciences should be established consisting of Crown and defence counsel, police, judiciary, scientists and laypersons. It should be created by statute.

Several parties before the Commission, including the CFS itself, recommended that an advisory board to the Centre be established. AIDWYC has suggested that such a board could provide independent and external advice to the CFS, and ensure meaningful communication between the Centre and other stakeholders in the criminal justice system. The CFS suggested that a board could provide a mechanism for ongoing suggestions and feedback in relation to CFS policies and performance.

I adopt this recommendation. The existence of an advisory board with broad-based representation would also promote impartiality, both in

appearance and reality.

The real issue here is the precise role of such an advisory board.

Dr. Young described the type of advisory board currently under consideration by the CFS:

What has arisen is an advisory board that functions on a lab-by-lab basis, so it's a local advisory board made up of local judiciary, defence counsel, Crown attorneys, scientists, coroners, and they meet on a regular basis and discuss issues such as new policy, and they have the chance to comment on it. They comment on performance of the lab, any new ideas, any new things that should happen. And they're finding that extremely useful and extremely successful. Illinois have basically patterned a model the same way, and again, speak very highly of it.

So it's our intention, in fact, to look at this model and to implement it. We think it increases the chances of meaningful communication and not going too far off the mark in the management of the lab.

Q. Now who would be on the advisory — who do you anticipate? I appreciate it's in the planning stage, but who do you anticipate would be on the advisory board?

A. The groups I had mentioned, including defence Bar and judiciary, coroners, pathologists, the stakeholder group, the users of the service who all have a role to play in the actual policy and operation of the lab.

Q. All right.

A. But we don't see it as being a body — they won't actually establish all of the policy, but they'll be there to advise on it.

In its written submissions, the Centre elaborated. It envisages an advisory board, meeting regularly to discuss and comment on policies and performance and providing advice and feedback to the Centre's management and to the Ministry. It would not be a decision-making or policy-making body.

Other parties suggested that the advisory board play a far more prominent role at the Centre. Such a board, it is contended, should establish policy and effectively operate as the Centre's board of directors, with the Director reporting to it. The concern which actuates this suggestion is that an advisory board which has no real power to compel policy or practices may be completely ineffective. The Canadian Bar Association — Ontario sees the advisory board as the Centre's interim Board of Directors, pending the re-constitution of the Centre as an independent agency.

In my view, the appropriate solution lies in between. The advisory board should be a statutory creature. Its composition and mandate should be regulated by statute. It should have its own budget, which is not dependent upon the Centre's own operational needs. Its meetings should be regular. The Director of the Centre should attend its meetings and report to it. Existing and proposed policies and practices should be reviewed with the board. New policies should only be implemented after the fullest discussion at the board. The board should not be a decision-making or policy-making body. However, the board should report annually or semi-annually to the government. The report should be public, and would include the board's position on policies and practices adopted by the Centre. This ensures that the day-to-day operations are run by the Centre's Director and staff, that the Director remain accountable to the government, but that the Centre and the government remain publicly accountable for the Centre's policies and practices. The board should also exist as a vehicle through which prosecutors, defence counsel and members of the judiciary can raise concerns about the Centre.

In my view, the establishment of such an advisory board need not await its statutory creation. Indeed, there are compelling reasons why it should be constituted *now*.

Recommendation 20: Quality Assurance Unit

(a) The recent establishment of a quality assurance unit by the Centre is to be commended. The unit's staffing and mandate should be reflected in written policies. Dedicated funds should be allocated to the quality assurance unit, adequate to implement this recommendation. The unit's budget should be insulated from erosion for operational use elsewhere.

(b) The unit should consist of at least seven full time members. The

Centre should be encouraged to hire at least half of the unit's members from outside the Centre. At least one member of the unit should have training in biology.

(c) The unit should include a training officer, responsible for internal and external training.

(d) The unit should include a standards officer, responsible for writing, or overseeing the writing of policies.

Dr. Young testified that a separate quality assurance unit was recently established at the CFS. A quality assurance manager has been appointed. Her duties include watching for ASCLD compliance on a regular basis, finding and distributing proficiency tests, and following up on their results. It is contemplated that six additional persons will be added to the unit in the future (most likely from within the ranks of the CFS). One will work directly with the manager, and three others will work directly with the individual sections. In addition, there will be a standards officer, who writes and develops policies, and a training officer, who is in charge of overall training, both internal and external. Dr. Young testified that the government has accepted the need for *five* full time quality assurance people, and has committed to funding them on a permanent basis.

My recommendations largely track those proposed by Dr. Young and the Centre. However, I think it important that a quality assurance unit not draw exclusively upon employees at the Centre. Outside hiring promotes new ideas, and an objectivity in approach. In my view, at least three members of the unit, unless completely impracticable, should be hired from outside the Centre.

Recommendation 21: Protocols respecting complaints to the Centre of Forensic Sciences

(a) In consultation with the advisory board, the Centre should establish, through written protocols, a mechanism to respond to, investigate and act upon complaints or concerns expressed by the judiciary, Crown and defence counsel, or police officers. The protocols should identify the person(s) to whom a complaint or concern should be directed, how it should be investigated and by whom, to whom the results should be reported and what actions are available to the Centre

at the conclusion of the process.

(b) Trial and appellate judges should be encouraged by the Centre, through correspondence directed to the Chief Justice of Ontario, the Chief Justice of the Ontario Court of Justice (General Division), and the Chief Judge of the Ontario Court of Justice (Provincial Division) to draw to the Director's attention, in writing, any concerns about testimony given by the Centre's scientists. Judges should be encouraged by the Centre to identify judgments, rulings or comments made by the Court in instructing the jury which are relevant in this regard. Transcripts should generally be obtained by the Centre of the relevant judicial comments, together with the witness' testimony.

(c) The Crown Policy Manual should be amended to provide that Crown counsel should draw to the Centre's attention such concerns, together with such particulars that will enable the matter to be investigated by the Centre. This policy should be encouraged through correspondence directed to the Ontario Crown Attorneys' Association.

(d) The private bar should be encouraged by the Centre, through correspondence directed to relevant organizations, including the Criminal Lawyers' Association and the Canadian Bar Association — Ontario, to draw to the Centre's attention such concerns, together with such particulars that will enable the matter to be investigated by the Centre.

(e) Police officers should be encouraged by the Centre, through correspondence directed to relevant police forces, or through the Ministry of the Solicitor General, to draw to the Centre's attention such concerns, together with such particulars that will enable the matter to be investigated by the Centre.

Dr. Young and Mr. Lucas both testified that there is no formal mechanism in place for the CFS to obtain feedback about the conduct of its employees, particularly about their testimony in court. Usually, such feedback is obtained by word of mouth or in casual conversation. When the CFS does receive feedback, it is usually in the form of positive comments. Dr. Tilstone explained that there is nothing in the ASCLD by-laws which speaks to complaints. If, for example, a scientist's bias is commented on in a trial judge's reasons for judgment or in his or her charge to a jury, there is no procedure

in place to ensure that this is brought to the Centre's attention.⁷²

Dr. Young testified that it is very important to get negative feedback. The CFS would like to be notified of any concerns expressed by judges or Crown attorneys over the alleged bias or unreliability of its scientists. Dr. Blake testified that being receptive to complaints, and dealing with them appropriately, will help avoid mistrust of a laboratory by the defence, and any perception of bias. Dr. Robertson welcomed the idea that Crown counsel be directed to bring any adverse finding made by a trial judge to the laboratory director's attention.

The idea of court cards was raised at the Inquiry by Dr. Young. Court cards are essentially evaluation forms which can be given to the parties in a case, and perhaps even the presiding judge after a trial, so that they can record their views on the conduct of any forensic scientists who testified in the case. Whether through this or another mechanism, Dr. Young supported the idea of inviting judges and requiring prosecutors to convey their concerns to the CFS. Dr. Robertson agreed that it would be helpful if prosecutors were instructed to do this. Dr. Tilstone expressed concerns about such evaluation forms. He suggested that trial counsel may be affected by the adversarial process, and would not be competent to comment on issues such as whether the expert strayed beyond the realm of his or her expertise. He believed that there is nothing better than another expert monitoring the scientist's testimony.

After this testimony was completed, the CFS initiated a six-month pilot project in early 1998 to obtain feedback from counsel regarding the testimony of CFS scientists in criminal and civil trials. The CFS will send a one page questionnaire to the Crown attorney and defence counsel involved in every trial at which a CFS scientist has testified. Counsel are encouraged to fill out the questionnaire and return it to the Quality Assurance Manager. The Manager will provide a copy of the responses to the testifying scientist and his or her supervisor, and discuss any points raised therein with the scientist. The questionnaire asks the following five questions:

⁷² During the Inquiry, I declined to permit cross-examination on allegations of bias at the Centre arising in other cases and in respect of scientists not testifying at this Inquiry. The relevant complaints or concerns should be directed to the Centre for investigation.

1. Was the testimony presented in a professional and clear manner?
2. Was the testimony presented objectively?
3. Was the testimony credible, relevant and understandable?
4. Did the witness convey a thorough knowledge of the discipline?
5. Additional comments. Use an extra page if necessary.

In my view, this pilot project is commendable. It will assist the Centre, in consultation with its advisory board, in structuring a long-term mechanism for complaints or concerns. I share Dr. Tilstone's concern that the advocate who tendered the scientist as a witness may be less likely to reflect upon that witness' testimony in any meaningful way. That is why all participants in the justice system, including the judiciary, should be encouraged to voice any concerns. That is also why this complaint mechanism is not a substitute for the monitoring of scientists' testimony by other scientists. It provides another vehicle to assist in bringing potential problems to the Centre's attention.

The Morins submit that the confidentiality of ASCLD reviews prevents the public and professionals in the legal system from accessing documentation of instances of poor performance by a scientist. One issue which the Centre and its advisory board must wrestle with is the extent to which the results of any complaint process should be accessible and, if so, how should such results be made available to counsel who wish to know if a scientist has, for example, previously overstated evidence. An overly 'transparent' complaint process may inhibit the initiation of complaints (or just 'concerns') and performance improvement. An inaccessible process may invite repetition in future cases.

Recommendation 22: Post-Trial Conferencing

The Centre of Forensic Sciences should establish a case conferencing process to assist in evaluating performance.

Dr. Young supported the creation of formalized case conferences to follow the completion of court cases in which the testimony of the CFS expert

was seriously disputed. Such case conferences would discuss the testimony given: Did it go too far? What could have been done better? Such a conference would parallel similar conferences conducted in other disciplines — for example, the medical post-mortem conference. Dr. Young envisages that the Centre's training officer would organize such conferences. I fully endorse this proposal.

Recommendation 23: Audits of the Centre of Forensic Sciences

As I have reflected, the CFS was accredited by the American Society of Crime Lab Directors (ASCLD) in 1993. As a condition of accreditation, it is required to conduct an internal audit of its operations every year. In addition, it is required to submit to an ASCLD inspection every five years. The ASCLD inspection is designed to ensure that the Centre continues to comply with accreditation requirements. The next ASCLD inspection will take place this year.

Internal audits are important tools to monitor and improve operations of the Centre, including quality control, and are intended to ensure compliance with CFS internal standards and accreditation requirements. They are also designed to uncover and remedy deficiencies. External audits add an important element of independence. They can also ensure that the CFS remains current in terms of its policies, procedures and equipment. The ASCLD inspections are specifically directed to compliance with accreditation requirements.

Mr. Cook testified that as a result of the Runciman Report, his laboratory is subjected to external audits every year. Dr. Tilstone testified that the National Institute of Science and Technology in the United States is developing a new accreditation program which will combine the best of all the current programs. When the new program is put in place, accreditation inspections will take place every two years.

The adequacy of the present internal and external auditing regime was the subject of considerable evidence and submissions at this Inquiry. A variety of alternatives were proposed to me.

AIDWYC has suggested that within 12 to 24 months, the Centre be audited by an international team composed of experts in forensic science, laboratory practice and management. This should be a management and

operational audit. Conclusions should be measured against 'best laboratory practice' and the goals identified by Dr. Young. The audit results should be publicly available. AIDWYC's submissions, in support of this proposal, state as follows:

The Inquiry has provided an important stimuli [sic] for change within the Centre. However, this spotlight will dim and the public, as well as the stakeholders in the system, have every right to know how well the Centre has done in making the changes identified by Dr. Young and how consistently the Centre scientists produce high quality laboratory work and effectively communicate the results of their scientific work to those who rely on it. For example, Dr. Young testified that the Centre has instituted a policy requiring a second opinion by a different scientist, when comparisons are made which necessarily include an element of subjectivity on the part of the examiner. This policy is inherently problematic as the second examiner is being asked to agree or disagree and is therefore aware of opinion of the first examiner. Dr. Young appreciated the limitations of this kind of check on an examiner's work and testified that, in addition, the Centre intended to introduce some "re-testing" in all areas of the laboratory's activity. This will involve handing over a case and having all the work re-done. Such a programme, if introduced on a sufficiently wide basis, will be an important component of internal laboratory proficiency testing. However, too little has been done to evaluate the success of this measure.

The Centre of Forensic Sciences disagreed with the proposal:

During the Inquiry it was suggested that public confidence in the competence of CFS staff needed to be restored, and that to that end an international audit of the CFS should be conducted within the next year. It was further suggested that the audit process be public. While the CFS understands the motivation for these suggestions, it is submitted that for practical reasons the Commissioner should not accept them. An ASCLD/LAB accreditation inspection is scheduled to take place at the CFS in 1998. The time and effort spent in preparing for this exercise is considerable, and would have to be duplicated if another audit were

conducted. Casework would certainly suffer if resources continue to be diverted to a further audit process.

Further, the ASCLD/LAB inspection process is intensive and includes a review of many files within the CFS, including past work, as well as observation of scientists at work. The inspectors are part of a small community of international specialists trained in forensic lab inspection. It is submitted, therefore, that this process is effectively an international audit and is sufficient to ensure that the science being performed at the CFS meets all accepted international standards.

With respect to whether the results of an audit, or the ASCLD/LAB process, should be public, it is submitted that this would be counter-productive. While the CFS recognizes that transparency has some benefits, it is submitted that it has disadvantages as well, and that on balance it is preferable to release publicly only the status of accreditation, along with the grades received upon accreditation. The CFS favours confidentiality for two reasons: First, public documents relating to quality assurance would inevitably become the subject of debate in criminal proceedings, adding time and expense to criminal litigation, with marginal benefit. Second, the rigour of quality assurance processes would inevitably be compromised by the spectre of public criticism. This detracts from one of the most important benefits of the quality assurance program, which is its effectiveness as a *bona fides* learning exercise. It is therefore submitted that beyond the status of accreditation and the accompanying grades, any other documentation must be confidential, subject only to what may be accessible under Ontario's Freedom of Information legislation.

The Centre revisited this issue in later submissions:

In its Recommendation 37 AIDWYC suggests that the CFS should be audited by an international team within the next 12 to 24 months. This is precisely what will occur during 1998 when the CFS is inspected by ASCLD/LAB for renewal of its accreditation. As demonstrated in its earlier submissions, the CFS intends to adopt policies in line with the practices

suggested by the experts before the Inquiry, and therefore to meet the "best practice" standard suggested by AIDWYC. The accreditation process will determine whether the CFS is complying with its own policies.

Notably, as stated by Dr. Tilstone in his testimony, the ASCLD/LAB program will soon be merging with ISO. When this the case, accreditation will take place every two years.

Dr. Young demonstrated, in his testimony, an obvious desire to make the CFS the best possible forensic institution. In this Report, I have endorsed many of the proposals which he put forward on behalf of the Centre. He, in turn, accepted in principle several suggestions for improvement put to him by Commission counsel. He was also impressed with the suggestions which came from the panel of forensic scientists who testified during the systemic phase, and he promised that those suggestions, not already adopted, would be seriously considered, together with my recommendations. I accept his good faith in this regard. I am also mindful of the Centre's justifiable concerns that the audit process not become so intrusive and time-consuming that its scientists cannot do their work.

However, having said that, AIDWYC, the Criminal Lawyers' Association and the Morins have raised significant concerns which I can recast in these terms. First, this Inquiry cannot evaluate the extent to which the proposals put to Dr. Young (and even accepted by him) will, in reality, be implemented and, even if implemented, done so in the most effective way. Second, the Centre has demonstrated a 'defensiveness' about its own failings — indeed, it is alleged that the Centre still does not appreciate the depth of these failings. Third, the Centre may be less motivated to make fundamental change once the glare of a public Inquiry has dissipated. Fourth, the accreditation process does not directly (or in the most effective way) address the most significant failings identified at this Inquiry — the culture of independence and impartiality, the form and content of reports, the overstatement of evidence in individual cases. A standardized accreditation inspection fails to meet the needs identified by this Inquiry. Fifth, there is a 'crisis of confidence' in the Centre. These legitimate concerns appear to motivate the suggestion, certainly by AIDWYC, that a full, independent, internationally based audit must be conducted to restore public confidence in the institution and ensure meaningful change.

I am reluctant to recommend that an additional full-scale management and operational audit, conducted by a newly constituted international team, be superimposed upon the existing external and internal audit process. In my view, a more focussed and limited recommendation would meet the legitimate concerns raised here.

(a) The Centre of Forensic Sciences should, in consultation with its advisory board, engage an independent forensic scientist (or scientists) no later than October 1, 1998, to specifically evaluate the extent to which the failings identified by this Inquiry have been addressed and rectified by the Centre. The scientist's (or scientists') final report should be made public.

Dr. Young was concerned by the prospect of 'public' audits. He believes that transparency would inhibit the free discussion of problems within the CFS. He also feared that the results of audits could be misused in court. The specific and focussed evaluation which I recommend does not, in my view, raise these issues.

(b) The Centre of Forensic Sciences should support the movement to re-accreditation every two, rather than five, years.

The Morins have also suggested that an external audit be done of the biology section and its work for the last 10 years in seriously contested cases. In particular, they recommend that the audit embrace the work of the serology section. They further recommend that a report prepared on September 19, 1997, by Dr. Margaret Kuo be referred to an advisory panel for a discussion of appropriate methods of follow-up, with a report issued by the panel by September 30, 1998.

Dr. Kuo's report was prepared pursuant to a request by the CFS for an independent assessment of the performance of its serology unit in the late 1980's and early 1990's. In brief, Dr. Kuo found that the unit performed satisfactorily in the 1980's, but experienced severe personnel shortages in the 1990's, leading to a backlog of work and reliance on a difficult and inconsistent test method.⁷³

⁷³ Dr. Kuo also stated that as the CFS was inspected and accredited in 1993, it might be inferred that ASCLD/LAB inspectors were satisfied with the quality of the work

I did not permit cross-examination of Dr. Young based upon Dr. Kuo's serology report, since its connection to the issues in this case was somewhat tenuous and given my interpretation of my mandate. Accordingly, I do not intend to make recommendations relating to the appropriateness of auditing the serology work done by the Centre: not because I think the suggestion does or does not have merit; it simply exceeds the proper scope of my mandate.

Recommendation 24: Monitoring of Courtroom Testimony

The Centre of Forensic Sciences should more regularly monitor the courtroom testimony given by its employees. Monitoring should, where practicable, be done through personal attendance by peers or supervisors. Monitoring should exceed the minimum accreditation requirements. All scientists, regardless of seniority, should be monitored. Any concerns should be promptly taken up with the testifying scientist. The monitoring scientist should be instructed that any observed overstatement or misstatement of evidence triggers an immediate obligation to advise the appropriate trial counsel.

Dr. Tilstone testified that the accreditation requirement for the monitoring of courtroom testimony is fulfilled at the Forensic Science Service in South Australia through having peers and supervisors attend court to evaluate the analyst's testimony:

The ASCLD LAB standard, which is an essential one, is that testimony is monitored, everyone's testimony is monitored at least once a year. It does not mandate the manner in which it is done. Now in my opening presentation this morning, I described how I asked that be done in Adelaide. It was a matter of internal policy, or internal preference, perhaps would be more accurate, but it was done by a peer or a supervisor being present.

But the ASCLD LAB program allows it to be done, for example, by simply taking a card, and handing that to the instructing attorney, and asking the attorney to complete it and return it.

during the early 1990s.

.....

Some feedback is better than none, but the feedback that you are going to get from the card system is always going to be imperfect, and it's not even just the question of perhaps coloured by feelings at the time it was completed. It's what you can ask on the card and the quality of the responses you can get. Part of what I was seeking from the feedback is how technically competent were the answers? Was this witness staying within her realms of expertise or straying beyond them? Were the responses that were given complete, and fair, and balanced?

And it takes a scientist who knows the area to give that, and there is no way that an attorney can give a good response to that sort of situation.

Mr. Lucas testified that it is desirable that the scientist's section head attend Court, observe the scientist's testimony (at least once a year) and prepare a report on it. Mr. Lucas explained that sometimes a scientist will not testify in a given year. Alternatively, if a scientist does testify, it may only be in a remote region of the province, where it is difficult to have another expert attend. Dr. Young added that live monitoring of testimony causes problems because it removes someone from the laboratory who would otherwise be working on other active cases. But Dr. Young accepted that without adequate monitoring one cannot ensure that every CFS scientist is testifying in an objective manner.

The evidence clearly established that personal attendance for courtroom testimony is the preferable type of monitoring. Unlike the reading of transcripts, the monitor can evaluate the manner of presentation of the witness, observe the impact of the evidence, and provide instant feedback during the currency of the case. In my view, it is a critically important aspect of quality control — assuming that the monitor is alive to the failings identified at this Inquiry. Several witnesses noted that most problems with forensic scientists do not relate to their laboratory skills, but rather to the fairness and accuracy of their findings, as communicated to the court.

Ideally, the monitor should be the witness' supervisor or, if impracticable, a scientist knowledgeable in the discipline. The Quality Assurance Unit at the CFS should organize the monitoring and be responsive

to problems which are identified.

Review of transcripts should not be substituted for in-person monitoring of testimony. Although such a review will be a desirable supplement in a number of cases, and the only option available in others, it does not offer as effective a means of scrutinizing the true impact of an expert's testimony.⁷⁴

Live monitoring involves continuing resource issues. These are addressed later in this Report.

Recommendation 25: Training of Centre of Forensic Sciences employees

The Centre of Forensic Sciences' training program should be broadened to include, in addition to mentoring components, formalized, ongoing programs to educate staff on a full range of issues: scientific methodology, continuity, note keeping, scientific developments, testimonial matters, independence and impartiality, report writing, the use of language, the scope and limitations upon findings, and ethics. This can only come with the appropriate allocation of funding dedicated to training.

Dr. Young testified that the CFS plans to establish a full time training officer, hopes to strengthen the independence component of its training programs, and would like to engage in external as well as internal training. I endorse these plans. It was also clear to me that an adequate, on-going training program requires the allocation of dedicated funding by government.

Recommendation 26: Proficiency testing

The Centre of Forensic Sciences should increase proficiency testing of its scientists. Efforts should be made to increase the use of blind and external proficiency testing for analysts. Proficiency testing should evaluate not only technical skills, but interpretive skills.

⁷⁴ One effective use of transcripts may involve a review of the testimony of any scientist tendered by the opposing party to challenge the Centre's expert. If the reviewer agreed with the other scientist, an obligation of disclosure would be triggered.

ASCLD accreditation currently requires that each analyst be subjected to one annual proficiency test, which may be internal. ASCLD also requires that an external test be conducted in every area of operation each year. Dr. Tilstone explained, however, that each area of operation encompasses a number of sub-disciplines. Thus, for example, hair analysis is a sub-discipline of a larger category. As such, there is no requirement that each hair analyst submit to an external proficiency test every year. Dr. Tilstone added that the ASCLD guidelines indicate that each sub-discipline should be tested, but they do not demarcate the sub-disciplines. As such, he felt that the guidelines would probably be satisfied if one sub-discipline was externally tested, and the others internally tested.

Dr. Young acknowledged that the CFS has not always been able to obtain external tests for every forensic sub-discipline. Whenever it cannot, it devises an internal test for the relevant scientists:

There are areas then, where our — in one year for example, the trace evidence might have a paint or fibre case, but not a glass, or vice-versa. We would then internally create a test and test our people internally in the areas that aren't available externally. So in fact, the ASCLD requirement is that someone in a section be tested once a year, and we ensure that, but we ensure that if they aren't tested externally, that everyone else is tested internally on a yearly basis. So each person receives some form of a proficiency test during the course of a year.

Mr. Lucas testified that external proficiency tests for hair analysis have not been available since the 1980s. I recommend that the CFS investigate all avenues for obtaining external proficiency tests generally and for hair and fibre analysts in particular. Not only do such tests allow for outside independent scrutiny of CFS results, but they allow the CFS to properly assess the performance of its analysts. Mr. Lucas testified that an important benefit of having the same material examined by a number of different laboratories is that “you find out what the state of the art is with that particular kind of sample, and so you have something to judge the results of an individual by.”

Efforts should also be made to increase the use of blind proficiency tests, that is, tests which are disguised as regular case submissions so that the examiner does not know he or she is being tested. Mr. Lucas testified that

blind testing is a more objective and ultimately preferable method of testing. Dr. Young said that blind testing can detect bias as well as bad science.

The evidence disclosed that there are difficulties with blind proficiency testing. Mr. Lucas testified that the CFS tried blind testing several years ago, and the examiners always figured out that they were tests and not real cases. He also stated that it is difficult to produce identical 'fake' cases for several different laboratories, yet it is important for a range of laboratories to participate so that a norm for the case can be established. Dr. Robertson testified that blind testing can be expensive, time-consuming, and difficult in the context of hair examinations which involve comparisons of patterns and not a purely descriptive process. He also suggested that blind tests were difficult to produce, in that the person designing the test must somehow avoid trace samples which anyone can distinguish (which would be pointless), or samples which even the best examiners will find hard to distinguish (which would only prove that trace examination is not easy).

Dr. Young testified that the CFS plans to engage in some blind testing, although it is not currently doing any.⁷⁵ The CFS has indicated that it has committed a quality assurance technician to the creation of blind tests. I encourage the CFS to pursue this method of testing, if at all practicable. Mr. Cook testified that his laboratory performs some blind hair and fibre testing. Mr. Lucas testified that a study in the United States is currently examining whether it is feasible to develop a blind proficiency testing program for forensic science. The CFS should look to these resources for guidance in developing its own program of blind proficiency testing.

Recommendation 27: Defence access to forensic work in confidence

(a) The Centre of Forensic Sciences, in consultation with other stakeholders in the administration of criminal justice, should establish a protocol to facilitate the ability of the defence to obtain forensic work in confidence.

(b) The Centre should facilitate the preparation of a registry of duly qualified, recognized, independent forensic experts. This registry should

⁷⁵ In its written submissions, the CFS indicated that it is currently conducting blind testing.

be accessible to all members of the legal profession.

The Centre's current policy dictates that its scientists may be retained by the defence at no charge. However, any findings must be provided both to the defence and to the prosecution. As a result, the Centre's scientists are rarely retained by the defence. This, in turn, fosters mistrust and a perception that the CFS is partial to the prosecution. As the Criminal Lawyers' Association notes, this mistrust has been exacerbated by the revelations at this Inquiry.

There was wide consensus that defence access to confidential forensic work by the Centre would reduce the perception of partiality. As well, as Mr. Cook, Dr. Young and Dr. Blake noted, it would better expose CFS scientists to both sides of the adversarial process, thereby enhancing actual impartiality.

There was also widespread recognition of the problems which arise from any defence access to the Centre's scientists on a confidential basis. These include:

- resource issues which could be expected to arise from increased use of the Centre by the defence;
- morale issues arising out of the prospect of one Centre scientist testifying 'against' another;
- difficulties in preserving confidentiality, particularly where two scientists from the same section are working on the case, one for the prosecution, the other for the defence;
- the inability of one scientist in a section to seek guidance from another, due to confidentiality issues, undermining the movement to increased monitoring and supervision and less isolation;
- concerns that the scientist's work may uncover evidence relevant to another case in which he or she is involved at the instance of the authorities (for instance, DNA results exculpate the client/accused on this case, but not on another case within the Centre).

The Criminal Lawyers' Association, the Canadian Bar Association — Ontario and AIDWYC forcefully contend that these issues can be resolved and that the importance of impartiality at the CFS compels access to confidential services by the defence. The Ontario Crown Attorneys' Association acknowledged the importance of the issue, but contended that the Centre does not have the institutional resources and, as currently structured, is unable to engage in confidential communications with defence counsel. It urged me to recommend that “there be a dedication of resources to permit defence counsel representing indigent accused to obtain the assistance of non-CFS experts on a confidential basis.”

The Centre of Forensic Sciences provided a detailed analysis of the problems and proposed solutions. The analysis draws upon the evidence of Dr. Young and the other witnesses who testified before me. It reads, in part:

The CFS is aware that the disclosure aspect of its current policy is of concern to defence counsel and is interested in finding another viable option. A number of models for the provision of forensic services to the defence are available. Where the CFS is already doing work for the Crown on a case, defence work on that case could be done by (1) another jurisdiction (*e.g.* the R.C.M.P. or Quebec laboratories); (2) the CFS Northern Laboratory; (3) another person at the CFS. The CFS prefers and is currently exploring the first option, since it avoids a number of problems with the other possibilities. In particular, the CFS Northern Lab has very limited resources; there may not be enough scientists within the CFS to ensure complete independence from one another; and there may be a morale problem created if two CFS scientists take different positions in the same case. In addition, questions arise as to what obligations there would be on a CFS scientist in the event that work done for the defence reveals information about another crime being handled by the CFS on behalf of the Crown. In their visits to other laboratories, Drs. Prime and Young found it notable that those which do defence work on a confidential basis generally find it very difficult to manage.

A fourth option, suggested to the Commissioner, is that a new institution be created with the specific

mandate of performing work for the defence only. In Australia, for example, the National Forensic Institute, composed of five individuals, has a mandate of research as well as of service to the defence. The CFS does not oppose the creation of a separate institution, but is concerned that it would not be viable. It would require a huge investment of resources, for equipment and staff, all of which would duplicate services already provided by the CFS. Such expenditure would inevitably be a target for government cutbacks in the future. The institution would either disappear, or be too small to provide adequate service in all forensic disciplines. It is submitted that a solution which utilizes existing resources is preferable.

The CFS intends to invite open discussion with the defence bar as soon as the viability of the R.C.M.P./Quebec option is known. Negotiations with these parties have already been commenced. The CFS is prepared to look at other options if the R.C.M.P. or Quebec laboratories reject their proposals. For example, if necessary the CFS would consider the Australian policy discussed by Dr. Tilstone, which would be the following:

- With respect to items requested by the defence which had not already been examined by the Crown, the CFS would perform the work on a confidential basis as long as two scientists (a primary analyst and a reviewer) who had not worked for the Crown on the case were available to do the work.
- With respect to **new** tests on items requested by the defence which have already been examined by the CFS on behalf of the Crown, the CFS would perform new work on a confidential basis as long as the defence obtained the item from the Crown, and as long as two scientists (a primary analyst and a reviewer) who had not worked for the Crown on the case were available to do the work.
- The CFS would not perform re-testing or provide commentary on a report already made by someone working in the Centre.

Another aspect of the CFS policy which appeared to be

troubling to the defence bar during the course of the Inquiry was the fact that their conversations with forensic scientists, to inquire about a particular case, are not treated as confidential. The current policy of the CFS is that reports to Crown counsel of conversations with defence are generally not encouraged, unless the information obtained from defence counsel impacts on the evidence which the forensic scientist intends to give at trial. In this circumstance, it is submitted that the forensic scientist has an obligation to inform the Crown that its view of the evidence has been influenced by information obtained from the defence. There are differing views within the CFS as to what information should be kept confidential since arguably the "client" relationship with prosecuting agents creates an obligation of complete disclosure. The CFS believes that the current policy is the only viable option. It is notable that in any event, today all conversations are recorded in the conversation log and thus are available to the Crown and the defence.

In my view, the defence bar has a need for access to confidential forensic services.⁷⁶ It would be ideal if the defence bar could obtain those services at the Centre of Forensic Sciences, given the pre-eminent role it plays in forensic science in Ontario. It would also enhance the impartiality and appearance of impartiality of the CFS itself. But I share many of the concerns expressed about the practical ability of the Centre to service the authorities and also service the defence bar on a confidential basis. Most particularly, there are great difficulties associated with the provision of confidential services to the defence where the section involved is also working at the instance of the authorities. Indeed, I wonder whether, realistically, defence counsel would be sufficiently comforted by rules of confidentiality that they would retain a scientist working side-by-side with a scientist involved in the same case at the instance of the prosecution. These difficulties may or may not

⁷⁶ I should again make clear that this need is to be distinguished from reciprocal disclosure, which I earlier addressed. It is one thing to suggest that the defence be obligated to disclose the expert evidence it intends to call so as to provide reasonable notice to the Crown and facilitate an informed treatment of science in the courtroom. It is another thing to inhibit the defence from investigating the scientific issues, because it fears that an unfavourable investigation will yield more evidence to be used by the prosecution in its case.

be resolvable.

I do not intend to recommend one solution over the other. That is because I strongly feel that the solution should be arrived at by the stakeholders in the justice system, not me. It is important that the CFS formulate its position on this issue, only after full consultation with all of the stakeholders involved, most particularly the defence bar.

Whatever solution is adopted, I agree with the Ontario Crown Attorneys' Association that the Centre should facilitate the creation of a registry of duly qualified, recognized, independent experts outside the Centre that can be accessed by the defence. Of course, defence counsel have no obligation to resort to such a registry. However, the use of the registry by the defence may significantly eliminate issues of expertise or competence arising at trial.

On a different, but related topic: conversations which CFS employees have with defence counsel at present are not confidential and may be reported to the Crown. Indeed, they should be noted, as should conversations with Crown counsel. However, I agree with the tenor of the Centre's submissions that CFS employees should not be encouraged to report on these conversations to the Crown, with the view to obtaining for the Crown a partisan advantage. They should be expected to advise the Crown of matters raised in their conversations with defence counsel which will have an impact on their evidence. The Crown is entitled to be so advised. Put succinctly, the scientist's conduct should be in keeping with his or her role as an independent, non-partisan expert witness. This also means that the Centre should encourage its scientists to be fully accessible to the defence, upon request. (The new Crown policy speaks to this issue.) In fairness, there is no evidence before me that the Centre has ever adopted a policy to the contrary.

Recommendation 28: The Role of the Scientific Advisor

The 1997 Report by Mr. Justice Archie Campbell addressed systemic problems identified as a result of the investigation conducted into the deaths of Leslie Mahaffy and Kristen French. The Campbell Report has been adopted by government and, as I understand it, multi-disciplinary working groups are moving towards the implementation of the investigative model which it contains. The Campbell Report also introduces the role of a *scientific advisor* into the investigation of serious crimes.

The appropriate role of a scientific advisor to an investigation was revisited at this Inquiry in the face of the failings revealed here. The issue here was framed well in the submissions filed on behalf of the Centre and the Morins respectively.

Dr. Young outlined the Campbell model and its ability to address several problems also evident in the Jessop investigation. His (and the Centre's) position were articulated as follows:

A major issue raised during the Inquiry was the general the lack of co-ordination and effective communication among the participants in the criminal justice system during the investigation stage of the Jessop homicide. These shortcomings tended to undermine a cohesive approach to the solution of the crime. It is submitted that many of the problems in the areas of co-ordination and communication apparent in the Jessop case will be eliminated with the full implementation of the new model for the investigation of major crimes in Ontario described in the 1997 Report of Justice Archie Campbell ("Campbell Model"), which has been adopted by Government. This model includes a new role for forensic sciences in the investigative process. The impetus for the Campbell model was the systemic shortcomings in the performance of law enforcement agencies in the investigation of the Jessop, French and Mahaffy homicides.

Dr. Young in his testimony described the Campbell model in detail and, in particular, its impact on the role of forensic science in major cases like the Jessop homicide. The Campbell model significantly enhances the co-ordination among those engaged in the investigation, including forensic scientists, by providing a simple and effective method for the exchange of information through multi-disciplinary case conferencing.

Where there is a major crime which is confined to one policing jurisdiction, a scientist from the Centre is appointed as scientific advisor. The scientific advisor manages the case from the standpoint of forensic science and is the contact point with the Centre of Forensic Science. Such person will direct what work is

done by the CFS and will not only prioritize it, but will prevent unnecessary use of resources on inappropriate or unproductive testing or analysis. In addition, the case conferencing called for in this model will maximize effective communication among those engaged in the investigation and minimize misunderstanding, including misapprehension of the significance of any forensic evidence.

In the case of multi-jurisdictional major crimes, or those crimes with that potential, the use of the Serial and Predator Crime unit may be triggered. Typically, but not exclusively, such triggering will be the result of crimes in different policing jurisdictions being linked by the ViCLAS system or by a hit in the DNA data bank. The prospect of effective use and communication of forensic science in the solution of crime is very much enhanced by the fact that scientific advisors representing the Centre of Forensic Science and the Coroners office are involved on the Executive Board of the Serial and Predator Unit continuously and, once the use of the Unit is triggered, such representation is present on the Joint Management Team which oversees the specific multi-jurisdictional investigation. In the multi-jurisdictional investigation model the benefits of improved communication of investigative findings, including scientific ones, is further enhanced by case conferencing at both the Joint Management Team and Executive Board levels.

A further benefit of the Campbell model arises from the fact that the multi-disciplinary case conferencing continues after the laying of charges and before the case proceeds to trial. Because of this feature, and the fact that the Crown attorney will then be involved, there is a much better prospect that those conferencing with the Crown will themselves have an accurate picture of the case, including the forensic science evidence and its significance, and therefore there will be less possibility of misunderstanding on the part of the Crown attorney.

In the result, when the Campbell model is fully implemented in Ontario the potential for uncoordinated investigation featuring inadequate communication and misunderstanding among participants should be a thing of the past. From the

perspective of forensic science, as Dr. Young expressed it:

I think what we're trying to do is get a balanced approach that will create a quality investigation... The idea of it is that you need all of the components (police, forensic science, Crown) and the components must work in a cooperative way, but each must stand on its own, and must be impartial. And I think it's paramount to the whole model that impartiality in fact is built into it, and that those groups are not there to always get along and never challenge each other; quite the opposite.

During his testimony Dr. Young was asked whether the Campbell model might encourage lack of objectivity on the part of the forensic scientist. He responded as follows:

Well, you deal with tunnel vision in a different way. That's why there's a joint management committee, that's why the case conferencing is multi-disciplinary. Yes, there is a risk that people can develop that, but there's a greater risk if they're sitting in isolation. And I think Justice Campbell recognised that, and was very firm that you don't improve bad communication by doing less of it, and by isolation. You improve it by doing more of it, but you put protections in place. You have a multi-disciplinary approach, people will catch each other in that, and you make sure that objectivity is paramount to it.

I've never been to a meeting, a case conference, and I've been to a lot, where a multi-disciplinary approach where anybody is shy about saying to the police: You're off on a tangent, you're wrong about this, you have to do this. It just, by the nature of people interacting like that, they can't wait to get their views in, and to make sure that they're giving other ideas. And it's a risk that it doesn't happen. It works very well, and I can say that, because I've done it. I've done it extensively the last few years.

The forensic scientists who testified before the Inquiry also stated that full exchange of information is necessary. For example, Roger Cook put it as

follows:

Q. To what extent is it necessary that the scientist work with the police?

A. I think it's absolutely necessary. I feel that we would not get the best Centre of Forensic Sciences if forensic scientists were locked away in a laboratory, and not working closely with investigators.

Problems arise when forensic scientists work in isolation without sufficient information concerning the investigation.

The Morins have suggested that “[i]n a major investigation, the person appointed as the scientific advisor to the investigation team should not be a scientist who is directly involved in examining evidence in the case.” This is an excerpt from their submissions:

105. Cook provided information about the use of the specialist advisor in England. He testified:

This is a recent introduction within the Forensic Science Service. The specialist advisors are people who, particularly with large complex crimes, where there may be several different court-going officers. One, for example, looking at firearms, one looking at blood and blood stain distribution, and one maybe looking at hair and fibre work. The specialist advisor will take an overview of all that work, and facilitate the work for the police officers, so that the work was done on schedule, and on time.

And then bring the work together at the end, and ensure that there is an understandable interpretation for the prosecution services, as well as the police after the work has been completed. (Citations omitted.)

106. Young testified that present practice would likely result in the scientific advisor in a serious case being a scientist who was doing practical work on the case. He did not believe that this would magnify the dangers of compromising the independence of that

scientist. He strongly rejected the proposal in the form being recommended. He was asked:

Q. Do you not think, Dr. Young, that perhaps a better solution would be to have a scientific advisor present at case conferences who is not hands-on the case, who can in turn work with his own people subsequently —

A. No, I don't.

Q. [R]ather than potentially infect each and every scientist in the case with the police vision, which is so often tunnel vision, in the development of a suspect, leading to an arrest of a suspect?

A. No, I don't agree with that model, and the reason I don't is, what you lose in that is two things. You've improved the situation — I think it's an improvement on the current model, because what it does is, it means that the messages going back to the scientist are going back from a scientist, so you've improved on that problem. But what you've lost is, you're making an assumption that a scientist understands all of the aspects of science, and will get all of the messages right. And that's the problem, that they don't.

Unfortunately, his opposition does not take into account the kinds of dangers experienced in Morin's case, and discussed by Glidewell L.J. in the *Ward* case. The problems of lack of objectivity, lack of independence, and institutional bias are too well documented to be ignored. For a hands-on scientist to become a part of the investigative team would only exacerbate the dangers. The recommendation reflects a compromise between the need for good coordination of the investigation in a major case (as recommended in the Campbell Report) and the necessity to maintain as much as possible the integrity, objectivity and independence of the individual scientists doing practical work on the case.

The Centre, in turn, responded in this way:

Recommendation number 2-9 of the submission of Mr. Morin's counsel states that the scientific advisor should never be a person doing hands-on scientific work in a particular case. Dr. Young rejected this suggestion in his testimony, stating that it is the nature of the case which should dictate who the scientific advisor will be. The only fixed rule in relation to the scientific advisor should be that they are a senior scientist with appropriate training. Given the limited number of senior scientists available at the CFS, and the number of major cases which may require a scientific advisor, it is unrealistic to expect that the advisor will not be a hands-on scientist.

Moreover, the CFS disputes the suggestion that the involvement of the hands-on scientist in case-conferencing endangers objectivity. Indeed, it is envisioned that all scientists involved in the case may at some point take part in case-conferences. Dr. Young indicated that the model is intended to emulate the situation in England, described as follows by Mr. Cook:

This is a recent introduction within the Forensic Science Service. The specialist advisers are people who, particularly with large, complex crimes, where there may be several different court-going officers. One, for example, looking at firearms, one looking at blood and blood stain distribution, and one maybe looking at hair and fibre work. The specialist adviser will take an overview of all of that work, and facilitate the work for the police officers, so that the work was done on schedule, and on time. And then bring the work together at the end, and ensure that there is an understandable interpretation for the prosecution services, as well as the police after the work has been completed.... It's coordination, and working -- I mean, these are the people that I would see as working very closely with the police to make sure that they get the very best out of forensic science.

The point of the model is to get rid of the one-on-one interactions which Ms. Nyznyk experienced in the Jessop case, but not to isolate scientists from the police.

Communication is enhanced by the designation of a specific liaison person and by provision of a controlled environment for the free discussion of all scientific issues.

Also, it must be remembered that the scientific advisor will not necessarily possess all of the scientific expertise which needs to be canvassed within the case conference. There will always be a need for the scientists directly involved to speak with the investigation team.

My views fall between these two articulated positions.

A ‘scientific advisor,’ contemplated by the Campbell mode, serves an important role and addresses concerns identified at this Inquiry. The use of a ‘scientific advisor’ should, therefore, be encouraged. There should be no prohibition upon the designation as scientific advisor of a forensic scientist who is directly involved in the forensic examinations associated with the case. This is impracticable. However, mindful of the concerns identified at this Inquiry, the CFS should encouraged, where practicable, to designate a scientific advisor who is not also the scientist whose own work is likely to be contentious at trial.

Recommendation 29: Post-conviction retention of original evidence

The Ministries of the Attorney General and Solicitor General, in consultation with the defence bar and other stakeholders in the administration of criminal justice, should establish protocols for the post-conviction retention of original evidence in criminal cases.

There appears to be no overriding retention policy for original evidence in Ontario. Such a policy need be implemented, addressing, at a minimum:

- □ the length of time for retention;
- □ the physical locale for retention; and
- the conditions under which original evidence, particularly biological evidence, is to be retained to

prevent its contamination and degradation.

Such a policy must recognize that technology, as in the Morin case, may permit more discriminating testing to be done in the future and that a number of miscarriages of justice have only been rectified through the testing of original evidence retained well beyond the expiry of conventional judicial proceedings. Such a policy may also take into consideration the extent to which the proceedings to which the original evidence relates were contested, and the extent to which the evidence bore upon contested issues. One issue which should be explored is whether an accused can waive the retention of original exhibits by the authorities.

The CFS has undertaken a survey of retention schedules in laboratories around the world. A wide variation was found, reflecting the fact that there are no universally held views on the matter. The ongoing advancements in DNA testing has made this an important issue to address.

This problem is being wrestled with in other jurisdictions as well. For example, Frank Sundstedt told the Inquiry that there was an ‘ongoing legal debate’ in Los Angeles respecting this issue.

Dr. Young recognized the importance of retention:

A. Storage and retention, I think we should realize that this is a relatively new issue, because of the advent of DNA that — I mean, we’ve gotten through — the first one hundred years we saw a forensic science without this being a big issue, so what was done, and how it was done is, as I think the panel indicated, is loopy-goopy to say the least. It’s because it just wasn’t an issue. It was very, very rare that something came up.

DNA and biology specimens are changing that, and there’s no question, there isn’t policies anywhere right now that I’m aware of that are very definitive. Everybody’s struggling with this. We asked about it in England, and I gather from Doctor Robertson that it’s a problem in Australia, as well. Generally, the approach is to make it a police responsibility to store. We are going to have to at some point work out the guidelines of where and how. We’re trying to work the guidelines at the Centre for what we’ll retain and how

we'll do it, as well, and we're drafting papers on that.

But our suspicion is, as Doctor Robertson says, that the bulk of the things will probably go back. They go back sealed now, but what happens to them, I think that's a valid issue, but one that there shouldn't have to be a lot of work done, whether we've built — you know, one place for the whole province or whether the municipal police do it and how big they will be and how long we keep them, because there isn't finite space.

Q. No, I appreciate it, I take it as a matter of principle because of the evolving of nature of the technology, you'd agree that accommodation should be made to house, in a way that is safe and secure, as well as to ensure that they don't get contaminated, these exhibits, for a much longer time than we do it today?

A. I'd say it's wonderful if you can go back and you've got the specimen and you can test it and solve the problem, and that's what we're all interested in. I have no problem [with that] at all.

I was later advised of the particulars of the draft policies currently contemplated by the Centre. They contain these features:

- Items submitted for examination will generally be returned to the submitter at the completion of a case.
- Materials removed from items which are in a form that can be packaged so as to preserve their integrity will be returned with the other items and a notation made in the record of their disposition with the case file.
- Materials whose integrity would be compromised by return to the submitter will be retained at the CFS according to a specifically designed policy for each section. The retention of this material and its storage location will be noted in the case file and in a separate log maintained for this purpose.
- Under no circumstance will case items or sub

samples⁷⁷ be retained in files.

The draft policy for the biology section, in respect of items which are not returned to the submitter, is the following:

- Hair and fibre slides and tapings will be retained for 10 years after the work is done in non-homicide cases and indefinitely in homicide cases.
- Fluid blood samples will be retained and then destroyed two years after the work is done in cases involving death and after three months in other cases; the blood stain produced from these samples will be returned to the submitter with other case items on completion of the case.
- Amplified DNA will be retained in a frozen state and then destroyed after six months.
- Extracted genomic DNA will be retained in a frozen state indefinitely.

This draft policy is already in operation, to be finalized along with the other policies currently in development.

There is much in this draft policy that commends itself to me. However, since it only became known during closing submissions, I do not intend to comment further upon its specifics. It is important that the CFS seek out the reaction of other stakeholders to the policy before finalizing it.

Recommendation 30: Protocols for DNA testing

The Ministries of the Attorney General and the Solicitor General, in consultation with the forensic institutions in Ontario, the defence bar and other stakeholders in the administration of criminal justice, should establish protocols for DNA testing of original evidence.

⁷⁷ I presume these are samples extracted from original evidence (for example, fibres on slides taken from fibres on tapings). There was no evidence on the point.

In the *Morin* and *Milgaard* cases, protocols were established to permit the DNA testing of original evidence in a way that was satisfactory to all parties. It would be advisable that protocols be generally established to address these kinds of situations, particularly where there is a defence request for DNA testing after conviction.

Recommendation 31: Revisions to Crown Policy Manual respecting testing

The Ministries of the Attorney General and Solicitor General should amend the Crown Policy Manual on physical scientific evidence to reflect that forensic material should be retained for replicate testing whenever practicable. Where forensic testing at the instance of the authorities is likely to consume or destroy the original evidence and thereby not permit replicate testing, the defence should be invited, where practicable, to observe the testing. Where defence representation is impracticable (or where no defendant is as yet identified), a full and complete record must be maintained of the testing process, to allow for as complete a review as possible.

One of the systemic issues before me was the appropriate practice to be followed where original evidence would be destroyed or consumed by scientific testing.

The CFS said this:

One of the systemic questions raised before the Commission was what should be done regarding material which would be consumed or destroyed if a certain procedure is performed on it. Drs. Tilstone and Robertson were of the view that it is preferable to consume only that amount of material which is necessary to perform the test, so that sufficient material is available to repeat the test at a later time. However, if there is insufficient material available to perform a test, or the material would be destroyed by a particular test, then the value of the particular test must be assessed. They agreed that they would have,

[N]o hesitation in consuming all of a sample where I believe that I could get the most

discriminating test done, because of my assuredness that the defence could test what I've done by view of the records of the work.

Dr. Robertson also stated that a policy whereby the client and/or the defence is notified every time a specimen is consumed would be very impractical.

The CFS takes the same view as these experts. With continued attention to record keeping one can be assured that the CFS will be able to provide an accurate and meaningful review of the tests done by CFS scientists.

Dan Mitchell, a senior prosecutor in Thunder Bay, also reflected his concern that some scientific testing that is destructive must be done at the earliest opportunity and cannot await defence involvement (for example, lifting fingerprints from a crime scene).

In my view, there are several related issues raised.

First, it is obvious to me that, as Dr. Blake stated, “the hallmark of scientific reliability is the ability to reproduce a result.” It follows that, wherever possible, sufficient material should be retained to allow for replicate testing by the defence, if desired. ASCLD guidelines provide that every effort must be made to save as much material as possible for potential re-analysis in the future. Dr. Blake stressed the importance of retaining sufficient biological evidence to allow for replicate testing, noting that the National Academy of Science in the United States recently approved of the principle with respect to DNA testing. Dr. Robertson testified that the principle has been included in Australian forensic protocols. Dr. Young accepted that the principle is a good one.

Second, sometimes destructive testing is the most desirable and discriminating testing available. What should the forensic scientist do where such testing is indicated, but the preservation of sufficient material to permit re-testing is unlikely or impossible (for instance, highly discriminating testing that will destroy the tested fibres)? In my view, protocols should govern such testing. The defence (most probably through a retained expert) should be invited to observe the destructive testing as it occurs. In the event that there is no defendant at the time of the test, or performance of the test cannot await such an invitation, the CFS should retain as complete a record of the testing

and the results as possible in order to allow for scrutiny by any future defendant.

The Runciman Report in England included a similar recommendation. It reads:

Where scientific material is in the hands of the prosecution, and a suspect has been charged and is legally represented, the defence should have an enforceable right to observe any further scientific tests conducted on it or, unless the material exists only in minute quantities, the right to remove some of the material subject to proper safeguards, so that tests can be carried out by defence scientific experts.

The current Crown policy on scientific evidence makes no reference to the issues of preservation of evidence and destructive testing in the context of examinations conducted on behalf of the Crown. It should be amended (along with any related CFS policies) to reflect the principles I described above.

The current Crown policy does refer to testing by the defence. In the context of evidence which forms part of a court exhibit, the policy states that “it will generally be appropriate to seek to have the Court include in the order, terms governing ... attendees at testing and *requiring that an official appointed by the Crown be present*” (emphasis added). These terms will normally be appropriate where the testing is destructive (in the way I earlier described). Of course, there may be other circumstances where the presence of a Crown appointee is mandated. However, in my view, it is difficult to understand why the presence of an official appointed by the Crown should normally be sought or ordered otherwise. It is my understanding that Crown counsel do not make this request as a rule now. Any issues of continuity are addressed through other terms imposed upon the defence and its representatives.

Recommendation 32: DNA data bank

A national DNA data bank, as contemplated by Bill C-3, now before Parliament, is a commendable idea, proven in other jurisdictions, and it should be adopted in Canada.

Canada would not be alone in creating a national DNA data bank. Dr. Tilstone advised that 48 American states have passed DNA data bank legislation. Dr. Robertson pointed out that England and Wales have a very large and successful database, and that Australia and New Zealand are working towards creating their own data banks. Dr. Young stated that the experience in Britain and elsewhere has shown that such databases help solve old serious crimes.

There was widespread support for the creation of a DNA data bank amongst the parties at this Inquiry. The York Regional Police Association made forceful submissions in its favour. In my view, such a data bank would be a useful investigative tool, both in identifying guilty parties and in excluding suspects.

I do not intend to comment upon the nuances of the legislation currently before Parliament. No submissions were directed to that issue. My recommendation is intended only to support the principle of such a bank.

Recommendation 33: Backlog at the Centre of Forensic Sciences

The Centre of Forensic Sciences should eliminate its backlog through increased use of overtime and an increased complement of scientists and technicians to enable it to provide timely forensic services. This can only come with the appropriate allocation of government funding specifically earmarked for this purpose.

During the Jessop investigation and the *Morin* proceedings which followed, the Centre of Forensic Sciences, most particularly the biology section, was burdened with a heavy workload and backlog of cases. Dr. Young advised me that this backlog continues to burden the CFS to this day. The survey of Ontario prosecutors, filed by the Ontario Crown Attorneys' Association, reflects that 74 percent of the respondents have experienced significant delay in obtaining forensic results, with the biology section involved 61 percent of the time. Mr. Lucas testified that the backlog has forced the CFS to prioritize examinations on the basis of meeting court dates, as opposed to more desirable bases such as providing investigative leads. He added that this has been particularly true in the biology section.

This situation is unquestionably problematic. As I indicated earlier, although time constraints always exist, overloading scientists through

excessive workloads is a recipe for disaster. It can contribute to the conviction of the innocent and the exoneration of the guilty through sloppy or incomplete science.

Dr. Young reflected, *inter alia*, on the desirability for increased training, education, monitoring and supervision, proficiency testing, the increased documentation of scientists' work and their contacts with others, and more complete and accurate report-writing. Though these and other recommended changes are of critical importance, they can also result in increased backlogs, since they take away from the time that scientists otherwise have to conduct casework. Dr. Robertson agreed, pointing out that it takes a lot of time to write reasonably full reports; if those kinds of reports are desired, sufficient resources have to be put into a laboratory to allow scientists the time to write them. On a larger scale, he said that a critical mass of expertise and resources must be maintained at a laboratory in order to do trace work properly, and it must be accepted that an analyst may have to spend months on one case.

Many of the recommendations contained in this Report will increase the time and financial constraints on the CFS.

Dr. Young testified that the CFS was recently given an additional \$300,000 — money which will likely be spent on overtime by the end of the 1997/1998 fiscal year. He stated that the CFS needs additional funds in order to continue to combat the backlog problem. I agree.

Recommendation 34: Forensic research and development

The Centre of Forensic Sciences should dedicate resources to research and development. The Province of Ontario should provide adequate funding to implement this recommendation.

In its written submissions, the Centre of Forensic Sciences stated:

Research and development should be an integral part of operations at the CFS. Drs. Prime and Young observed that this was the case in the best laboratories around the world, where it is recognized that being on the leading edge requires involvement in current scientific issues. The importance of research was also recognized by the Runciman Commission. Increased

involvement of the CFS in research will require a major infusion of funding.

I endorse this suggestion. Without research and development — and funding for it — the CFS risks becoming outdated in its technology and procedures. Further, the extent to which meaningful inferences can be drawn with any degree of reliability in hair and fibre or serological work is dependent on research. Given the ever-increasing reliance on forensic evidence, it is imperative that the best science possible be employed.

Recommendation 35: Resource requirements

The specific recommendations referable to the Centre of Forensic Sciences involve, by necessary implication, the infusion of additional financial resources into the Centre. It is imperative that such an infusion occur, to ensure that the Centre can serve a pre-eminent role as a provider of critical forensic services, that it can do so in an impartial, accurate and timely manner, and that future miscarriages of justice can thereby be avoided. In this context, miscarriages of justice include both the arrest and prosecution of the innocent, and the delayed or failed apprehension of the guilty.

On the issue of resources, the Centre said this:

It is submitted that the CFS has done all that it can to better itself within the constraints of its current budget. A significant amount of new resourcing has been provided to the CFS since the mid 1980's, including creation of the Northern Lab, introduction of DNA technology with the building of a new facility and with new staff, new equipment for the hair and fibre unit, and \$300,000 of funding to begin backlog elimination. Funding has also been provided to staff the new quality assurance unit.

Nevertheless, it continues to be the case that the goal of timely casework competes with the goal of quality assurance, since supervision, training, peer review and continuing education all require time away from casework. To date, accreditation has been achieved with minimal increase in resources and thus has had an adverse impact on the backlog and timeliness. Timeliness is particularly important if

forensic science is to be used effectively as an intelligence tool. Timeliness not only can affect the direction of an investigation, but also can assist in the cost-effective management of police resources at the outset of an investigation.

Therefore, in addition to the steps which the CFS has already been able to implement, it is of vital importance to the capacity of the CFS, to maintain an adequate standard of forensic science services, that the necessary funding be obtained so that the following steps can be taken:

- The backlog at the CFS should be eliminated. This will require that the CFS be able to fund overtime to do a backlog elimination blitz. Without such a blitz the CFS and the justice system will be shackled with the inability to provide timely forensic services.
- The number of full time staff (scientists and technologists) at the CFS should be increased. This will require that the CFS receive funding for additional positions.
- The training program should be broadened further to include, in addition to the mentoring components, more formalized programs, including formalized ongoing staff development. This will require an increase in funding designated for training, including funding for regular attendance at courses offered by other institutions and at scientific conferences, particularly those where the defence perspective is presented.

In my recommendations and commentary upon them, I have supported these and other changes. Some of them, like those mentioned here by the Centre, are dependent upon financial resources. In my view, it is imperative that these financial resources be provided. Although fiscal constraints on government cannot be ignored, quality cannot be sacrificed. The stakes for the criminal justice system are too high.

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