

**The Law Commission**  
**Consultation Paper No 190**

**THE ADMISSIBILITY OF EXPERT  
EVIDENCE IN CRIMINAL PROCEEDINGS  
IN ENGLAND AND WALES**

**A New Approach to the Determination of  
Evidentiary Reliability**

**A Consultation Paper**



# THE LAW COMMISSION – HOW WE CONSULT

## About the Law Commission

The Law Commission was set up by section 1 of the Law Commissions Act 1965 for the purpose of promoting the reform of the law.

The Law Commissioners are: The Rt Hon Lord Justice Etherton (*Chairman*), Professor Elizabeth Cooke, Mr David Hertzell, Professor Jeremy Horder and Kenneth Parker QC.

The Chief Executive of the Law Commission is: Mr Mark Ormerod.

## Topic of this consultation

This consultation paper addresses the problems associated with the admissibility and understanding of expert evidence in criminal trials. We believe the current approach to the admissibility of expert evidence in criminal trials is in need of reform. We would welcome views on our provisional proposals.

This paper is the first Law Commission publication relating to this area of the law. It follows calls for reform from a number of scientists, practitioners and legal academics and from the House of Commons' Science and Technology Committee in its Seventh Report, *Forensic Science on Trial* (2004-2005) HC 96-1. The Committee recommended that the Forensic Science Advisory Council, judges, scientists and other key players in the criminal justice system should work together to develop a new test for determining the admissibility of expert evidence in criminal proceedings.

We have already discussed our provisional proposals with a number of academics, legal professionals and the Forensic Science Regulator. Our consultation paper has also been reviewed by HHJ Jeremy Roberts QC.

## Scope of this consultation

The purpose of this consultation is to generate responses to our provisional proposals with a view to making recommendations for reform to Parliament. Our proposals are set out in Part 6. Our key questions for consultation are set out in paragraphs 6.78 to 6.83.

## Geographical scope

This consultation paper refers to the law of England and Wales.

## Impact assessment

An impact assessment, setting out the potential impact of our proposed reforms, is included as Appendix C. Key questions for consultation regarding this assessment can be found in paragraphs C.59 to C.62 of Appendix C (and in paragraphs 6.84 to 6.88 of the consultation paper itself).

## Duration of the consultation

We invite responses from 7 April to 7 July 2009.

### How to respond

Please send your responses either –

**By email to:** expert.evidence@lawcommission.gsi.gov.uk; OR

**By post to:** Raymond Emson, Law Commission, Steel House, 11 Tothill Street, London SW1H 9LJ

Tel: 020 3334 0272 / Fax: 020 3334 0201; OR

**Online at:** <http://www.lawcom.gov.uk/lc-forum>

If you send your comments by post, it would be helpful if, whenever possible, you could send them to us electronically as well (for example, on CD or by email to the above address, in any commonly used format).

## After the consultation

In the light of the responses we receive, we will decide our final recommendations and we will present them to Parliament. We hope to publish our final report in 2010. It will be for Parliament to decide whether to approve any changes to the law.

## Code of Practice

We are a signatory to the Government's Code of Practice on Consultation and carry out our consultations in accordance with the Code criteria (set out on the next page).

## Freedom of information

We will treat all responses as public documents in accordance with the Freedom of Information Act and we may attribute comments and include a list of all respondents' names in any final report we publish. If you wish to submit a confidential response, you should contact us before sending the response. PLEASE NOTE – We will disregard automatic confidentiality statements generated by an IT system.

## Availability of this consultation paper

You can view/download it free of charge on our website at: <http://www.lawcom.gov.uk/docs/cp190.pdf>.

# CODE OF PRACTICE ON CONSULTATION

## ○ THE SEVEN CONSULTATION CRITERIA

### **Criterion 1: When to consult**

Formal consultation should take place at a stage when there is scope to influence the policy outcome.

### **Criterion 2: Duration of consultation exercise**

Consultations should normally last for at least 12 weeks with consideration given to longer timescales where feasible and sensible.

### **Criterion 3: Clarity and scope of impact**

Consultation documents should be clear about the consultation process, what is being proposed, the scope to influence and the expected costs and benefits of the proposals.

### **Criterion 4: Accessibility of consultation exercises**

Consultation exercises should be designed to be accessible to, and clearly targeted at, those people the exercise is intended to reach.

### **Criterion 5: The burden of consultation**

Keeping the burden of consultation to a minimum is essential if consultations are to be effective and if consultees' buy-in to the process is to be obtained.

### **Criterion 6: Responsiveness of consultation exercises**

Consultation responses should be analysed carefully and clear feedback should be provided to participants following the consultation.

### **Criterion 7: Capacity to consult**

Officials running consultations should seek guidance in how to run an effective consultation exercise and share what they have learned from the experience.

## ○ CONSULTATION CO-ORDINATOR

The Law Commission's Consultation Co-ordinator is Correna Callender.

- You are invited to send comments to the Consultation Co-ordinator about the extent to which the criteria have been observed and any ways of improving the consultation process.
- **Contact:** Correna Callender, Consultation Co-ordinator, Law Commission, Steel House, 11 Tothill Street, London SW1H 9LJ – Email: [correna.callender@lawcommission.gsi.gov.uk](mailto:correna.callender@lawcommission.gsi.gov.uk)

**Full details of the Government's Code of Practice on Consultation are available on the BERR website at <http://www.berr.gov.uk/files/file47158.pdf>.**

**THE LAW COMMISSION**

**THE ADMISSIBILITY OF EXPERT EVIDENCE IN  
CRIMINAL PROCEEDINGS IN ENGLAND AND  
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# PART 1

## INTRODUCTION

### THE SCOPE OF THIS PAPER

- 1.1 In this consultation paper we address the problems associated with the admissibility and understanding of expert evidence in criminal proceedings. Of particular importance in this context is the approach which should be adopted for scientific, or purportedly scientific, evidence tendered for admission in Crown Court jury trials.<sup>1</sup>
- 1.2 Three factors relevant to determining the admissibility of expert opinion evidence were conveniently summarised by King CJ in the Australian case of *Bonython*.<sup>2</sup> These factors, which are also part of the common law in England and Wales,<sup>3</sup> are:
  - (1) “whether the subject matter of the opinion is such that a person without instruction or experience in the area of knowledge or human experience would be able to form a sound judgment on the matter without the assistance of a witness possessing special knowledge or experience in the area”,<sup>4</sup>
  - (2) “whether the subject matter of the opinion forms part of a body of knowledge or experience which is sufficiently organized or recognized to be accepted as a reliable body of knowledge or experience, a special acquaintance with which by the witness would render his opinion of assistance to the court”,<sup>5</sup> and

<sup>1</sup> In criminal proceedings in a magistrates’ court or the Crown Court, the tribunal of fact – the individual(s) responsible for determining disputed issues of fact – may be: a single district judge in a magistrates’ court; a bench of lay magistrates; lay magistrates and a professional Crown Court judge (for a re-hearing on appeal against a conviction in a magistrates’ court); or, for trials on indictment, a Crown Court jury. In this paper we generally refer to “the jury” rather than the “tribunal of fact” for ease of exposition and because it is in jury trials that the problems associated with expert evidence are most likely to arise. The individual in the Crown Court who is responsible for determining whether evidence is admissible and, if so, whether it ought nevertheless to be kept from the jury, is the trial judge (the tribunal of law).

<sup>2</sup> (1984) 38 SASR 45, 46 to 47 (Supreme Court of South Australia).

<sup>3</sup> The Court of Appeal has cited *Bonython* on a number of occasions, see, eg: *G* [2004] EWCA Crim 1240, para 15; *Luttrell* [2004] EWCA Crim 1344, para 32; *Dudley* [2004] EWCA Crim 3336, para 30; and *Harris* [2005] EWCA Crim 1980, para 270.

<sup>4</sup> This accords with the leading English case of *Turner* [1975] QB 834, 841: “An expert’s opinion is admissible to furnish the court with ... information which is likely to be outside the experience and knowledge of a judge or jury. If on the proven facts a judge or jury can form their own conclusions without help, then the opinion of an expert is unnecessary.”

<sup>5</sup> In broad terms this factor requires that the “subject matter of the [expert witness’s] opinion” should be sufficiently reliable to justify the admission before the jury of an expert opinion founded on it.

- (3) “whether the witness has acquired by study or experience sufficient knowledge of the subject to render his opinion of value in resolving the issues before the court”.<sup>6</sup>
- 1.3 A fourth requirement is that that the expert must be capable of providing an impartial opinion,<sup>7</sup> in recognition of the fact that an expert’s overriding duty is to the court and not the party calling him or her to testify.<sup>8</sup>
- 1.4 Our purpose in publishing this consultation paper is to set out and elicit feedback on proposals which relate to, but are slightly broader than, the second of the four requirements listed above. We do not address the other factors relevant to the determination of admissibility.
- 1.5 In line with the position at common law, we accept that expert evidence should be admissible in criminal proceedings only if it is sufficiently reliable to be considered by the jury. In this paper, however, we make proposals for a new approach to the *determination* of evidentiary reliability of expert evidence in criminal proceedings. This has required us to address two separate, but related, issues:
- (1) the fundamental question whether the subject matter of the expert’s evidence is sufficiently organised or recognised to “be accepted as a reliable body of knowledge or experience” (the second of the four requirements listed above); and
  - (2) the case-specific question whether the particular expert witness has properly drawn from that “reliable body of knowledge or experience” to provide a reliable opinion on the factual issue(s) the jury must resolve.<sup>9</sup>

<sup>6</sup> The witness must have sufficient knowledge and experience to justify having his or her opinion placed before the jury as an expert opinion on the relevant matter. As a general rule, formal qualifications are unnecessary to be competent as an expert witness (see, eg, *Silverlock* [1894] 2 QB 766 and *Hodges* [2003] EWCA Crim 290). However, as a matter of practical reality, a witness is unlikely to be regarded as an expert for some fields (such as medicine) unless he or she has relevant qualifications as well as experience. In *Robb* (1991) 93 Cr App R 161, Bingham LJ suggested that the opinion evidence of an amateur psychologist would be inadmissible.

<sup>7</sup> *Field v Leeds City Council* [2001] 2 CPLR 129.

<sup>8</sup> For criminal proceedings the expert’s overriding duty to provide an “objective, unbiased opinion” is now explicitly set out in rule 33.2 of the Criminal Procedure Rules 2005. There has been concern for some time, however, that some experts may be tempted to provide an opinion which favours his or her paymaster. See, eg, the view of Professor Graham Zellick, when Chairman of the Criminal Cases Review Commission, that high fees tempt experts to give unequivocal opinions just to secure their next case (*The Times*, 30 November 2004).

<sup>9</sup> We refer to expert *opinion* evidence, in line with the approach conventionally adopted when referring to an expert witness’s testimony on matters within his or her field. We appreciate, however, that an expert witness may sometimes provide non-opinion expert evidence. For example, an expert on a particular machine may be permitted to give evidence on how it operates, if relevant to an issue in the proceedings.



- 1.6 We focus primarily on the first of these two issues, but also address the second issue in our proposals.
- 1.7 We explain in Parts 2 and 3 of this paper why the present approach to the determination of evidentiary reliability of expert evidence, with regard to the “reliable body of knowledge or experience” condition, is proving to be problematic and why, accordingly, there have been calls for reform.
- 1.8 The other three rules governing the admissibility of expert evidence are relatively uncontroversial.<sup>10</sup> They may of course give rise to occasional problems in their *application* – for example, it may be difficult to determine whether a particular witness has sufficient knowledge and experience to be competent to provide an expert opinion or whether an expert witness is providing an unbiased opinion – but we believe the rules themselves are fundamentally sound and readily comprehensible. In our view, these rules do not need to be altered (but we would welcome consultees’ views on whether we should use the opportunity provided by this project to consider codifying them in primary legislation).
- 1.9 Once we have explored the problems associated with the current approach to the admissibility of expert evidence, in Parts 2 and 3, we go on to consider:
- (1) whether reform is desirable or necessary; and, if so,
  - (2) whether such reform should comprise:
    - (a) the creation of a new statutory admissibility test for expert evidence (to supplement the other aspects of the present common law test);<sup>11</sup> and/or
    - (b) the introduction of statutory or other guidance to assist trial judges in determining whether expert evidence is sufficiently reliable to be placed before a jury.
- 1.10 Our view is that reform *is* needed. **We provisionally propose:**
- (1) **that there should be a new statutory test for determining the admissibility of expert evidence in criminal proceedings, which would apply whether the evidence is tendered by the prosecution or by the accused;**

<sup>10</sup> The rules described above in para 1.2(1) and (3) and in para 1.3.

<sup>11</sup> Above. It should also be noted that any manifestly unreliable evidence tendered by the *prosecution* can at present be excluded at common law or by the application of s 78(1) of the Police and Criminal Evidence Act 1984; see, eg: *Clarke* [1995] 2 Cr App R 425, 432; *Lawson* [1998] *Criminal Law Review* 883, 884; and *Luttrell* [2004] EWCA Crim 1344, para 34.

- (2) **this new test would provide that expert evidence is admissible only if the court<sup>12</sup> is satisfied that the evidence is sufficiently reliable to be admitted;<sup>13</sup> and**
  - (3) **in determining whether or not the test is satisfied the court would in all cases have to refer to a statutory list of guidelines for assistance.**
- 1.11 For Crown Court trials on indictment, we also address, and ask consultees to consider, the question whether the trial judge should exceptionally be able to call upon a court-appointed assessor to provide him or her with assistance when applying our proposed test.

### **RELATED MATTERS BEYOND THE SCOPE OF THIS PAPER**

- 1.12 It is worth repeating that we are focusing on the admissibility of expert *evidence*, and only one aspect of the admissibility test set out in *Bonython*.<sup>14</sup> We do not therefore make proposals which would address procedural difficulties which may currently be associated with the tendering of expert evidence in criminal proceedings, that is, matters properly falling within the remit of the Criminal Procedure Rules Committee.<sup>15</sup>
- 1.13 Given the relatively narrow focus of this particular reform project, we also believe it is important to state at the outset that, taken in isolation, our proposals for reforming the law governing the admissibility of expert evidence would not provide a panacea.
- 1.14 We believe that our proposals are likely to be most effective, as a mechanism for ensuring that only reliable evidence is placed before criminal juries, if they are complemented by extraneous measures to form a broader context of change. We say “extraneous measures” because, save for one problem, which the Government has already decided to address,<sup>16</sup> the measures we have in mind would not involve any reform of the law of criminal evidence.

<sup>12</sup> The Crown Court trial judge. In a magistrates’ court, the test would be applied by a professional district judge or by a bench of lay magistrates acting on advice provided by their legal adviser.

<sup>13</sup> The admissibility rule itself would effectively restate the common law rule. However, we believe that a new statutory test would ensure that the question is properly addressed by the advocates and trial judge and that a reasoned decision is given on whether the evidence is admissible or inadmissible.

<sup>14</sup> (1984) 38 SASR 45, 46 to 47; see para 1.2 above.

<sup>15</sup> For the current rules relating to expert evidence in the Criminal Procedure Rules, see Part 24 (covering the disclosure of expert evidence) and Part 33 (covering duties, experts’ reports, pre-hearing discussions and single joint experts).

<sup>16</sup> The problem is the absence of any obligation on the accused to make pre-trial disclosure of the names and addresses of his or her prospective expert witnesses. This problem will be resolved once s 35 of the Criminal Justice Act 2003 comes into force.

1.15 We believe that the following measures would complement the proposals we are making and that our proposals, in tandem with such measures, would solve many of the problems associated with expert evidence in criminal proceedings:

- (1) a more robust approach to the accreditation and regulation of expert witnesses, whether called by the prosecution or the defence;<sup>17</sup>
- (2) a disclosure process which would allow all parties to screen their opponents' expert witnesses in advance of the trial to assess, for example, their qualifications, relevant experience, extraneous conduct and whether or not they are accredited by a reputable body;<sup>18</sup> and
- (3) an enhanced training curriculum for new judges and junior lawyers which would:
  - (a) require them to have an understanding of the factors to be borne in mind when assessing the viability of a scientific (or purportedly scientific) hypothesis; and
  - (b) equip them to intervene effectively if an expert witness presents his or her evidence in an inappropriate way or strays from his or her legitimate field of expertise or provides an opinion predicated on unsound assumptions.

<sup>17</sup> A Forensic Science Regulator (FSR) appointed by the Home Secretary now has the task of setting and monitoring quality standards for the use of forensic science in the Criminal Justice System. This involves: identifying the need for new or improved quality standards; leading on the development of standards; and providing advice and guidance so that service providers are able to demonstrate compliance with standards. The FSR has recently proposed, amongst other things, that forensic providers, including expert witnesses, should be accredited by a recognised independent body to accepted standards and that they should be able to demonstrate, through an independent process, their ongoing competence and development. At present the FSR's remit extends only to evidence tendered by the prosecution, but it is feasible that this could be extended, by legislation, to cover defence experts. In any event, appropriate accreditation may in time become a criterion for determining whether the Legal Services Commission makes public funds available to pay for an expert witness called by the defence.

<sup>18</sup> This problem is in the process of being resolved. When s 6D of the Criminal Procedure and Investigations Act 1996 comes into force, the accused will have to make pre-trial disclosure of the name and address of all persons he or she has instructed "with a view to his providing any expert opinion for possible use as evidence at the trial". (Section 6D has been inserted into the 1996 Act by s 35 of the Criminal Justice Act 2003.) Rule 24.1(1) of the Criminal Procedure Rules 2005 already places the prosecution and accused under an obligation to "furnish the other party or parties and the court with a statement in writing of any finding or opinion which [the party] proposes to adduce by way of [expert] evidence". For the prosecution's disclosure obligations in relation to their "unused" evidence, including factors affecting the reliability of their expert witnesses, see ss 3, 4 and 7A of the Criminal Procedure and Investigations Act 1996 and, in particular, paras 8 to 12 of the Attorney General's Guidelines on Disclosure, April 2005 (the guidelines can be found at [www.attorneygeneral.gov.uk/attachments/disclosure.doc](http://www.attorneygeneral.gov.uk/attachments/disclosure.doc)).

- 1.16 We believe that measures of this sort would go some way towards ensuring that our proposed rules, and the other admissibility rules,<sup>19</sup> would be applied more effectively in practice. For example, a system of expert witness regulation and accreditation, in tandem with a more robust pre-trial disclosure process, would prevent charlatans and biased experts from being permitted to testify as expert witnesses.<sup>20</sup>
- 1.17 It is fair to say, however, that the problems associated with expert evidence can never be entirely resolved. Scientific knowledge is continuously advancing as more empirical research is undertaken, so it is inevitable that some hypotheses will come to be modified or discarded, that expert testimony based on any such hypothesis will subsequently come to be regarded as unreliable and that this will have a bearing on the legitimacy of convictions (and, to a lesser extent, acquittals) founded on such testimony.
- 1.18 This problem exists not because of any failings on the part of scientific experts or their methodology but because of the very nature of the scientific method. As the Court of Appeal noted in *Cannings*,<sup>21</sup> on occasion it will have to be accepted that “what was confidently presented to the jury as virtually overwhelming expert evidence providing the necessary proof ... should now be approached with a degree of caution”.<sup>22</sup>
- 1.19 A similar point was made, very recently, in the case of *Holdsworth*.<sup>23</sup>
- Conclusions of ... experts ... necessarily involve a process of induction, that is inferring conclusions from given facts based on other knowledge and experience. But particular caution is needed where the scientific knowledge of the process or processes involved is or may be incomplete. As knowledge increases, today’s orthodoxy may become tomorrow’s outdated learning. Special caution is also needed where expert opinion evidence is not just relied upon as additional material to support a prosecution but is fundamental to it.<sup>24</sup>
- 1.20 However, we believe that our proposals, if adopted, would ensure that convictions and acquittals would be founded on expert evidence only if the hypothesis and methodology underpinning that evidence can be shown to be trustworthy. We propose that “orthodoxy” which cannot be shown to be trustworthy should not be admissible.

<sup>19</sup> The three rules described above in para 1.2(1) and (3) and in para 1.3.

<sup>20</sup> Notorious examples of fraudulent “expert” witnesses who have been convicted in recent years include Godwin Onubogu (bogus medical doctor, convicted in 1998), Barian Baluchi (bogus psychiatrist, convicted in 2005) and Gene Morrison (bogus psychologist, convicted in 2007).

<sup>21</sup> [2004] EWCA Crim 1.

<sup>22</sup> Above, para 156.

<sup>23</sup> [2008] EWCA Crim 971.

<sup>24</sup> Above, para 57.

## THE STRUCTURE OF THIS PAPER

- 1.21 In Part 2 we explain the problems associated with expert evidence in Crown Court jury trials, with reference to some recent decisions of the Court of Appeal.
- 1.22 In Part 3 we explain the aspect of the present common law approach to the admissibility of expert evidence which reflects the requirement of the second *Bonython* criterion.<sup>25</sup> We then go on to explain why this approach has proved to be an unsatisfactory mechanism for dealing with the problems we have identified.
- 1.23 In Part 4 we address a number of options for reforming the law so as to provide a more principled, and we suggest better, approach to the determination of admissibility of expert evidence in criminal proceedings.
- 1.24 In Parts 5 and 6 we set out our conclusions and explain our provisional proposals.
- 1.25 At the end of Part 6 we summarise our provisional proposals and set out a number of specific questions we would like our consultees to consider.
- 1.26 In Appendix A we summarise a common law test which could, in theory, be applied to render any evidence, including expert evidence, inadmissible as a matter of law.
- 1.27 In Appendix B we describe the current procedural framework into which our proposals for reform would fit.
- 1.28 In Appendix C we address the likely impact of our proposals, if carried forward into law. We believe it is important that the social and economic impact of our provisional proposals is assessed, as this may have a bearing, in practical terms, on the desirability, and therefore the likelihood, of our proposed reforms being implemented. Appendix C therefore summarises the different options we have considered and then sets out the main costs and benefits associated with each option, on the evidence which is currently available. We also ask a number of questions with a view to eliciting more evidence relevant to our assessment so that, when we publish our final recommendations, we are in a position to provide a more accurate picture. These questions are also set out at the end of Part 6.
- 1.29 In Appendix D we describe some aspects of “poor science” the trial judge should look out for when applying our proposed test.

<sup>25</sup> Paragraph 1.2(2) above.

## PART 2

# THE PROBLEMS

- 2.1 It has long been accepted that specialised areas of knowledge, where relevant to the determination of a disputed factual issue, should be explained to the jury by experts in the field because the jury can be presumed to be unfamiliar with such areas. This does something to ensure that the jury does not draw erroneous inferences from the evidence before it and that it is properly equipped to determine how much weight, if any, to give to the evidence to which the expertise relates.<sup>1</sup>
- 2.2 It is therefore trite law that witnesses having a relevant degree of expertise are competent to testify on the factual matters which lie within their specialisation, to guide or assist the jury in its resolution of the disputed factual issues.<sup>2</sup> Indeed, the adduction of expert evidence is sometimes obligatory in criminal proceedings.<sup>3</sup>
- 2.3 The theoretical position is that experts are expected simply to educate the jury, to pass on the relevant aspects of their knowledge and expertise so that the jury itself can properly assess the evidence to which it relates. This no doubt holds true for some of the less complex areas of specialised knowledge. However, in cases where the field of expertise is particularly difficult to comprehend (for example, because an understanding of the field requires a preliminary understanding of advanced mathematics or statistics) it is no doubt fair to say that the jury may simply defer to the expert's own knowledge and opinion when considering how to resolve the disputed factual issue or issues to which the expertise pertains.<sup>4</sup>
- 2.4 An expert witness's opinion may therefore be extremely persuasive in terms of the assistance it can provide. The degree to which the expert's evidence will be persuasive, and therefore the likelihood that the jury will defer to the expert without forming an opinion of its own, is of course likely to depend on the complexity of the field.
- 2.5 This is not necessarily a bad thing if the expert's evidence is reliable, given that it would be quite impracticable to provide the jury with sufficient expertise of its own to avoid the possibility of deference.

<sup>1</sup> The test for determining admissibility is summarised in paras 1.2 and 1.3 above.

<sup>2</sup> Expert evidence is also admissible to help the judge (or magistrates) to decide questions of *law* such as: whether a would-be witness is competent to give evidence and, if so, whether he or she should give evidence on oath (Youth Justice and Criminal Evidence Act 1999, ss 54(5) and 55(6)); the question of "required capability" for hearsay evidence (Criminal Justice Act 2003, s 123(4)(b)); and whether a "special measures direction" should be made, varied or discharged (see Criminal Procedure Rules 2005, r 29.8).

<sup>3</sup> Expert psychiatric evidence is necessary if, eg, diminished responsibility or insanity has been raised; see *Dix* (1981) 74 Cr App R 306 and ss 1 and 2 of the Criminal Procedure (Insanity and Unfitness to Plead) Act 1991.

<sup>4</sup> See generally Roberts and Zuckerman, *Criminal Evidence* (Oxford, 2004) pp 292 to 296.

- 2.6 However, the possibility or likelihood of jury deference in relation to complex fields of knowledge gives rise to a danger if there are legitimate questions about the reliability of the expert's evidence. This may be because the expert's field of knowledge is a novel or developing science with little in the way of peer review, or because there are doubts as to the validity of the expert's methodology, hypothesis or assumptions, or for some other reason.
- 2.7 The problem is particularly worrying if there is no available expert in the same field who can be called by the opposing party to provide an effective criticism of the expert evidence in question, particularly if the forensic tool of cross-examination (by a non-specialist advocate) would provide only an ineffectual substitute. The jury in such cases may have no real option but to defer to the view of the expert even though his or her testimony may be insufficiently reliable to warrant such deference or, indeed, any consideration at all.
- 2.8 A related problem, touched upon in the preceding paragraph, is that the non-specialist individuals involved in the criminal trial process may have an insufficient understanding of the limitations of expert evidence, scientific evidence in particular. They may assume that just because an expert's evidence is presented as "scientific" it may be taken to be reliable. Certainly there is evidence to suggest that juries may find it difficult to understand or follow cross-examination aimed at revealing flaws in scientific methodology,<sup>5</sup> a problem which is likely to be more acute if the evidence is complex.<sup>6</sup>
- 2.9 Specific concerns have also been raised about:
- (1) the effectiveness of calling expert witnesses to contradict evidence given by an opposing expert;<sup>7</sup> and

<sup>5</sup> See, eg: B Black and others, "Science and the Law in the Wake of *Daubert*: A New Search for Scientific Knowledge" (1994) 72 *Texas Law Review* 715, 789; and MB Kovera and others, "Assessment of the Commonsense Psychology Underlying *Daubert*" (2002) 8 *Psychology, Public Policy and Law* 180, 185 and 189 to 191 (pointing to research suggesting that most jurors cannot differentiate between valid and flawed methodology).

<sup>6</sup> M Redmayne, *Expert Evidence and Criminal Justice* (2001) p 110 summarises research which suggests that as expert evidence becomes more complicated, jurors shift their focus and rely on peripheral indicia of reliability such as the expert's qualifications or demeanour. See also: J Sanders, "The Merits of Paternalistic Justification for Restrictions on the Admissibility of Expert Evidence" (2003) 33 *Seton Hall Law Review* 881, 901 to 914 and 936; CB Mueller, "*Daubert* Asks the Right Questions: Now Appellate Courts Should Help Find the Right Answers" (2003) 33 *Seton Hall Law Review* 987, 992; and *Forensic Science on Trial*, the Seventh Report of the House of Commons' Science and Technology Committee HC 96-1(2004–2005), pp 63 to 64. In the Canadian case of *Murrin* (1999) 181 DLR (4th) 320, 333, Henderson J noted that the "fact that the experts usually have impressive academic credentials and extensive experience may also serve to lend an air of 'mystic infallibility' to the evidence". There is also a risk that the jury may give undue weight to unreliable expert evidence simply because it appears to corroborate other evidence it has heard; see Redmayne, above, p 111.

<sup>7</sup> See MB Kovera and others, "Assessment of the Commonsense Psychology Underlying *Daubert*" (2002) 8 *Psychology, Public Policy and Law* 180, 193 to 194, pointing to research which suggests that an opposing expert is more likely to be called in cases where the challenged evidence is methodologically *sound*.

- (2) the ability or willingness of trial advocates to address methodological flaws in cross-examination before jurors.<sup>8</sup>
- 2.10 It is often said, moreover, that on account of its “aura of infallibility” scientific evidence has a particularly persuasive effect on jurors.<sup>9</sup>
- 2.11 We accept that the “aura of infallibility” concern *may* have been over-stated.<sup>10</sup> Nevertheless, it should not be thought that the problems referred to above are little more than abstract academic concerns bearing no relationship to the practical reality of criminal trials in England and Wales.
- 2.12 Several recent cases suggest there is a real, ongoing problem which demands an urgent solution. In short, it would appear that expert evidence is sometimes admitted too readily and that, notwithstanding a number of successful and highly-publicised appeals concerning the reliability of expert opinion evidence, there continues to be a “pressing danger” of wrongful convictions<sup>11</sup> (and, no doubt, wrongful acquittals).
- 2.13 The following cases exemplify this ongoing problem.

<sup>8</sup> See MB Kovera and others, “Assessment of the Commonsense Psychology Underlying *Daubert*” (2002) 8 *Psychology, Public Policy and Law* 180, 192; and see also JM Shellow, “The Limits of Cross-Examination” (2003) 34 *Seton Hall Law Review* 317, 319, suggesting that because juries have no understanding of the scientific method, cross-examination must focus on impeaching the character of the expert witness rather than demonstrating flaws in methodology.

<sup>9</sup> See, eg, *United States v Addison* 498 F 2d 741 (1974) 744 (“scientific proof may in some instances assume a posture of mystic infallibility in the eyes of a jury of laymen”) and *Mohan* [1994] 2 SCR 9, 21 (“Dressed up in scientific language which the jury does not easily understand and submitted through a witness of impressive antecedents, [expert] evidence is apt to be accepted by the jury as being virtually infallible and as having more weight than it deserves”). See also: JW Strong, “Language and Logic in Expert Testimony” (1992) 71 *Oregon Law Review* 349, 367, n 81 (“There is virtual unanimity among courts and commentators that evidence perceived by jurors to be ‘scientific’ in nature will have particularly persuasive effect”); and CT Hutchinson and DS Ashby, “Redefining the Bases for Admissibility of Expert Scientific Testimony” (1994) 15 *Cardozo Law Review* 1875, 1879, n 23 (American judicial and academic comments in the same vein).

<sup>10</sup> See, eg: EJ Imwinkelried, “The Next Step After *Daubert*” (1994) 15 *Cardozo Law Review* 2271, 2286 (“there is little or no hard evidence” to support the claim); and N Vidmar and SS Diamond, “Juries and Expert Evidence” (2001) 66 *Brooklyn Law Review* 1121, 1180 (“[e]mpirical data do not support a view that juries are passive, too-credulous, incompetent, and overawed by the mystique of the expert”). See generally M Redmayne, *Expert Evidence and Criminal Justice* (2001) pp 107 and 109 to 111.

<sup>11</sup> D Ormerod and A Roberts, “Expert Evidence: Where Now? What Next?” (2006) 5 *Archbold News* 5.



- 2.14 In *Dallagher*<sup>12</sup> D's conviction for murder was based almost entirely on prosecution expert testimony relating to the comparison of an ear-print made by D with a latent ear-print found on a window at the scene of the crime. D's conviction was quashed, and a retrial ordered, because fresh evidence cast doubts on the extent to which ear-print evidence, standing alone, could safely be used to identify an offender.
- 2.15 At D's trial one of the experts permitted to testify for the prosecution opined that he was "absolutely convinced" that D had left the print found at the scene, and a second prosecution expert was willing to countenance only a "remote possibility" that the print had been left by someone else.<sup>13</sup> However, at D's second trial in 2004 the prosecution had no choice but to drop its case against him as DNA evidence taken from the latent print unequivocally established that it had been left by someone other than D.<sup>14</sup>
- 2.16 In *Clark (Sally) (No 2)*<sup>15</sup> C's convictions for the murder of her two infant sons were quashed primarily because of the failure on the part of a prosecution expert to disclose test results for one of the deceased children. According to the Court of Appeal: "[the expert's] failure demonstrated that he had fallen a very long way short of standards to be expected of someone in his position upon whose evidence the court was inevitably going to be dependent".<sup>16</sup>
- 2.17 The Court then went on to criticise the statistical evidence given during the trial by another prosecution expert, a distinguished professor of paediatrics and child health. That expert had simply (and quite wrongly) assumed that there were no genetic or environmental factors affecting the likelihood of cot deaths,<sup>17</sup> and testified that in his opinion there was only a one in 73 million chance of having two cot deaths in the same family.

<sup>12</sup> [2002] EWCA Crim 1903. See generally WE O'Brian, "Court scrutiny of expert evidence: recent decisions highlight the tensions" (2003) 7 *International Journal of Evidence & Proof* 172.

<sup>13</sup> Above, paras 32 to 33. The Court of Appeal did not find any merit in the submission that the experts' opinions should have been ruled inadmissible on account of the inherent unreliability of inferences drawn from ear-print matches. The Court agreed with the view expressed in *Clarke* [1995] 2 Cr App R 425, 430, that there are "no closed categories where [expert] evidence may be placed before a jury" as it "would be entirely wrong to deny to the law of evidence the advantages to be gained from new techniques and new advances in science".

<sup>14</sup> *The Guardian*, 23 January 2004. The admissibility of ear-print evidence was recently reconsidered in *Kempster (No 2)* [2008] EWCA Crim 975, where it was held that an ear-print comparison is capable of providing information which could identify the person who left an ear-print on a surface, certainly where "minutiae" (small anatomical features such as notches and creases) can be identified and matched. However, it was accepted that in cases where the only information comes from "gross features" (the main cartilaginous folds) there is likely to be less confidence in a match between prints because of the flexibility of the ear and the uncertainty of the pressure applied, so gross features are capable of providing a reliable match only in cases where they "truly provide a precise match".

<sup>15</sup> [2003] EWCA Crim 1020. See generally: A Wilson, "Expert Testimony in the Dock" (2005) 69 *Journal of Criminal Law* 330.

<sup>16</sup> [2003] EWCA Crim 1020, para 164.

<sup>17</sup> Or "SIDS" – sudden infant death syndrome.

- 2.18 The Court opined that it was “unfortunate that the trial did not feature any consideration as to whether the statistical evidence should be admitted in evidence”<sup>18</sup> (even if the figure of one in 73 million had accurately reflected the chance of two cot deaths in the same family) and stated that remote possibilities should not be expressed in such stark statistical terms. The Court also accepted that there was in fact evidence to suggest that the figure of one in 73 million “grossly” misrepresented the chance of two sudden deaths within the same family from unexplained but natural causes.<sup>19</sup> The Court took the view that the way the expert had presented his evidence, referring to the chances of backing long odds winners on the Grand National year after year, may have had a major effect on the jury’s deliberations (despite the trial judge’s efforts to down play this aspect of the expert’s evidence) and that, if the question of the statistical evidence had been fully argued on appeal, it would in all probability have provided a quite distinct basis upon which to allow C’s appeal.<sup>20</sup>
- 2.19 The important point to note about this case is that, notwithstanding the trial judge’s subsequent comments, which were intended to mitigate the significance of the statistical evidence, and his directions on the dangers inherent in the way the figure of one in 73 million had been reached,<sup>21</sup> the expert had been permitted, first, to testify outside his field of expertise and, secondly, to give an unfounded and misleading opinion on the likelihood of multiple cot deaths within a single family. There had been no prior assessment of his assumption or hypothesis to determine whether his evidence was sufficiently reliable to be considered by the jury.<sup>22</sup>

<sup>18</sup> [2003] EWCA Crim 1020, para 173.

<sup>19</sup> [2003] EWCA Crim 1020, para 178. It is to be noted that the report containing the tabulated data the expert relied on was accompanied by an explanatory text which warned that the data did “not take account of possible familial incidence of factors other than those included” ([2003] EWCA Crim 1020, para 101).

<sup>20</sup> [2003] EWCA Crim 1020, paras 178 to 180. See also *Cannings* [2004] EWCA Crim 1, para 16: the “evidence was given by an expert witness of great distinction, if not pre-eminence in [the] field ... whose evidence would undoubtedly have carried great weight with the jury which tried Sally Clark”.

<sup>21</sup> [2003] EWCA Crim 1020, paras 104 and 106.

<sup>22</sup> A murder conviction was also based, at least in part, on misleading expert evidence in *George (No 2)* [2007] EWCA Crim 2722. An expert called by the prosecution suggested that a minute particle of firearm discharge residue found in G’s coat pocket supported the prosecution case that G had murdered the victim when in fact the evidence provided no such support.

- 2.20 In *Cannings*<sup>23</sup> the Court of Appeal quashed C's convictions for the murder of her two infant sons. It was held that the mere fact of two or more unexplained infant deaths in the same family could not be allowed to lead inexorably to the conclusion that murder had been committed, contrary to the view – indeed the “dogma” – amongst a number of expert paediatricians.<sup>24</sup>
- 2.21 Fresh evidence before the Court suggested that multiple cot deaths in the same family could have an underlying genetic cause. Indeed, a report before the Court, relating to the largest follow-up study of cot-death families, concluded that “the occurrence of a second unexpected infant death within a family is ... *usually* from natural causes”.<sup>25</sup>
- 2.22 In *Harris and others*<sup>26</sup> it was found that new evidence undermined the generally accepted medical view that a non-accidental head injury<sup>27</sup> to an infant child could confidently (in effect, always) be inferred from nothing more than the presence of a particular triad of intra-cranial injuries.<sup>28</sup>

<sup>23</sup> [2004] EWCA Crim 1. See generally: A Wilson, “Expert Testimony in the Dock” (2005) 69 *Journal of Criminal Law* 330.

<sup>24</sup> [2004] EWCA Crim 1, paras 18 to 20. The “dogma” was that one unexplained infant death in the family could be put down to natural causes, but two or more such deaths in the same family justified the inference that murder must have been committed. See also *Anthony (Donna)* [2005] EWCA Crim 952.

<sup>25</sup> Above, para 141 (emphasis added). The Court went on to conclude (at para 178) that

for the time being, where a full investigation into two or more sudden unexplained infant deaths in the same family is followed by a serious disagreement between reputable experts about the cause of death, and a body of such expert opinion concludes that natural causes, whether explained or unexplained, cannot be excluded as a reasonable (and not a fanciful) possibility, the prosecution of a parent or parents for murder should not be started, or continued, unless there is additional cogent evidence ... which tends to support the conclusion that the infant, or where there is more than one death, one of the infants, was deliberately harmed. In cases like the present, if the outcome of the trial depends exclusively or almost exclusively on a serious disagreement between distinguished and reputable experts, it will often be unwise, and therefore unsafe, to proceed.

However, in *Kai-Whitewind* [2005] EWCA Crim 1092 the Court of Appeal explained that this was not a general proposition of law to be applied whenever there is a conflict between expert witnesses.

<sup>26</sup> [2005] EWCA Crim 1980. See now *The Times*, 1 November 2006: “Scientists find the key to cot deaths”.

<sup>27</sup> Or “shaken baby syndrome”.

<sup>28</sup> Acute encephalopathy, bleeding around the brain and retinal bleeding.

- 2.23 The Court of Appeal noted evidence which suggested that the triad of injuries could be caused, albeit only rarely, by a minor fall or non-violent handling<sup>29</sup> and held that, without more, the mere presence of the triad could not automatically or necessarily lead to a diagnosis of non-accidental head injury.<sup>30</sup>
- 2.24 The key point to note here is that, until the appeals in *Harris and others*, the prosecution had been able to rely on nothing more than an expert diagnosis based on the triad to secure convictions, even though the diagnosis of a violent assault was predicated on empirical research comprising only a small, poor-quality database.<sup>31</sup>
- 2.25 We have given four examples of recent convictions based on what we regard as flawed expert evidence. An academic researcher writing in 2000<sup>32</sup> refers to a number of other examples of expert evidence of questionable reliability being admitted in recent years: voice identification based solely on auditory comparison,<sup>33</sup> stylometry; handwriting comparisons; diagnoses of “battered woman syndrome”; and the theory of repression and recovery which underpins the admissibility of recovered memories of sexual abuse.<sup>34</sup>
- 2.26 More worrying still, it may be that the examples given above represent the tip of a larger iceberg. It has been said that much other forensic scientific evidence relied on in criminal proceedings has not been properly validated, which suggests that there is at least a significant risk that some such evidence is insufficiently reliable to be admitted:

<sup>29</sup> [2005] EWCA Crim 1980, paras 78 to 79, 92 and 147. According to the Court (at para 148) recent evidence from the developing science of “biomechanics” along with findings from research conducted by a team of doctors led by a neuropathologist (JF Geddes) “had the effect of moderating to some extent the conventional view that strong force is required to cause the triad of injuries”.

<sup>30</sup> [2005] EWCA Crim 1980, paras 70, 152, 175 and 257. See also para 69: “[T]here remains a body of medical opinion which ... whilst recognising that the triad is consistent with [non-accidental head injury], cautions against its use as a certain diagnosis in the absence of other evidence.”

<sup>31</sup> See JF Geddes and J Plunkett, “The Evidence Base for Shaken Baby Syndrome” (2004) 328 *British Medical Journal* 719, quoting the conclusion of M Donohoe, “Evidence-based Medicine and Shaken Baby Syndrome” (2003) 24 *American Journal of Forensic Medicine and Pathology* 239, that “the evidence for shaken baby syndrome appears analogous to an inverted pyramid, with a very small database (most of it poor quality original research, retrospective in nature, and without appropriate control groups) spreading to a broad body of somewhat divergent opinions”.

<sup>32</sup> M Redmayne, *Expert Evidence and Criminal Justice* (2001) pp 98 to 99.

<sup>33</sup> *Robb* (1991) 93 Cr App R 161. The unreliability of auditory comparisons was recognised in *O’Doherty* [2003] 1 Cr App R 5 (77) where the Northern Ireland Court of Appeal held that, save for a few exceptions, auditory analysis evidence had to be supported or supplanted by acoustic analysis evidence. In *Flynn* [2008] EWCA Crim 970, at para 62, the Court of Appeal felt that *O’Doherty* had gone too far and that the key to the admissibility of auditory comparisons made by a lay witness was the witness’s degree of familiarity with the suspect’s voice.

<sup>34</sup> See also J Bourke, “Misapplied Science” (1993) 10 *Australian Bar Review* 123, 128 to 139, for examples taken from Australian case law.

Little is ... known about the true error rates for almost all forensic science techniques. The few disclosed error rates, however, are shockingly high. Most of forensic science operates outside of the peer review systems, and forensic science is seldom published. While forensic science techniques are accepted in forensic science, many are not accepted by a broader scientific community. Furthermore, the techniques accepted in forensic science are not used in such a way that would reveal their methodological flaws, if any.<sup>35</sup>

- 2.27 In short, expert evidence of doubtful reliability may be admitted too freely, be challenged too weakly by the opposing advocate and be accepted too readily by the jury at the end of the trial. The examples set out above illustrate, at a practical level, the problem with expert evidence in criminal proceedings and the need for reform. A jury cannot be expected to make accurate decisions if unreliable expert evidence, particularly scientific (or purportedly scientific) evidence, distorts their understanding of the facts.<sup>36</sup>
- 2.28 More to the point, because of the limited role of the Crown Court jury as a passive fact-finder, because weaknesses in an expert's evidence may not be effectively revealed during the trial, and because of the possibility or likelihood that the jury will simply defer to an expert's opinion, it is surely right in principle, as Professor Redmayne suggests, to demand that "the court ... screen expert testimony to ensure that jurors will not be put in the position of deferring to unsound opinions".<sup>37</sup> In other words, if expert evidence is insufficiently reliable to be considered by the jury it should not be admissible.

<sup>35</sup> RN Jonakait, "The Meaning of *Daubert* and What that Means for Forensic Science" (1994) 15 *Cardozo Law Review* 2103, 2117. See also: E Beecher-Monas, "Blinded by Science" (1998) 71 *Temple Law Review* 55, 66, (noting that there is virtually no empirical data or error rates for some types of scientific evidence relied on by the prosecution in the United States); and M Redmayne, *Expert Evidence and Criminal Justice* (2001) p 116 ("The claims of handwriting experts, forensic odontologists, and experts on hair and voice identification simply do not interest most scientists, and have been subjected to little empirical validation"). See generally: RN Jonakait, "Forensic Science: The Need for Regulation" (1991) 4 *Harvard Journal of Law & Technology* 109.

<sup>36</sup> See, eg, *Mohan* [1994] 2 SCR 9, 21: there is a "danger that expert evidence will be misused and will distort the fact-finding process".

<sup>37</sup> M Redmayne, *Expert Evidence and Criminal Justice* (2001) p 125.

- 2.29 Moreover, the alternative approach, that expert evidence should always be admitted in the expectation that the jury can effectively sort the (reliable) wheat from the (unreliable) chaff, does not sit easily with other aspects of the law of criminal evidence. For example, the jury is not permitted to hear a defendant's confession unless the judge has first established that it is sufficiently reliable to be considered,<sup>38</sup> and otherwise inadmissible hearsay statements may be admitted through the inclusionary conduit provided by section 114(1)(d) of the Criminal Justice Act 2003 only if the judge first ascertains that, amongst other things, the statement is sufficiently reliable to be considered (having made reference to a number of statutory indicia of reliability).<sup>39</sup>
- 2.30 It will be seen in Part 3 of this paper<sup>40</sup> that the Court of Appeal has recognised that expert evidence is inadmissible as a matter of law if it is insufficiently reliable to be considered by the jury. Unfortunately, however, it will also be seen that there is little if any guidance for trial judges should they be faced with the task of having to screen expert evidence to determine the question of admissibility.
- 2.31 In its recent Seventh Report, *Forensic Science on Trial*,<sup>41</sup> the House of Commons' Science and Technology Committee recommended that the Forensic Science Advisory Council, judges, scientists and other key players in the criminal justice system should work together to develop a new test for determining the admissibility of expert evidence in criminal proceedings. The Committee's view was that the present approach is unsatisfactory.
- 2.32 A number of scientists, practitioners and legal academics have come to the same conclusion, calling for a new basis for screening expert evidence to ensure that only sufficiently reliable evidence will be considered by the jury.<sup>42</sup> It is within the context of these demands for reform that our proposals should be considered.

<sup>38</sup> Police and Criminal Evidence Act 1984, ss 76(2) and 76A(2).

<sup>39</sup> Criminal Justice Act 2003, s 114(2), paras (e) and (f).

<sup>40</sup> Paragraph 3.1.

<sup>41</sup> (2004–2005) HC 96-1, pp 75 to 76.

<sup>42</sup> See, eg: P Alldridge, "Recognising Novel Scientific Techniques" [1992] *Criminal Law Review* 687, 698 (suggesting scrutiny by an extra-judicial committee); P Roberts, "The Admissibility of Expert Evidence" (1996) 4 *Expert Evidence* 93, 99 ("time to reconsider those sketchy, partly contradictory common law precedents, or even to replace them with a modern statutory framework to regulate the admissibility of expert evidence"); M Redmayne, *Expert Evidence and Criminal Justice* (2001) Ch 5; D Ormerod, "Sounding Out Expert Voice Identification" [2002] *Criminal Law Review* 771, 790 ("it would be desirable for the courts to apply a reliability test in all cases"); Roberts and Zuckerman, *Criminal Evidence* (2004) p 325 ("the admissibility of scientific evidence in criminal trials needs to be reconsidered afresh in the light of the practical demands of modern criminal litigation"); *Forensic Science on Trial*, the Seventh Report of the House of Commons' Science and Technology Committee (2004–2005) HC 96-1, p 76, citing the views of Dr C Pamplin (editor of the UK Register of Expert Witnesses), Professor Sir Alec Jeffreys and the Association of Chief Police Officers; A Campbell-Tiech QC and A Byrnes, "'Stockwell' Revisited" (2005) 6 *Archbold News* 4, 6 (criticising, in particular, facial mapping evidence); and D Ormerod and A Roberts, "Expert Evidence: Where Now? What Next?" (2006) 5 *Archbold News* 5. See also the comments of Weir J in *Hoey (Sean)* [2007] NICC at para 64.

2.33 But we should also draw attention to the fact that the absence of an effective test for excluding unreliable expert evidence may have far wider implications. If the innocent are convicted – or, for that matter, the guilty are acquitted – because juries are permitted to rely on unreliable evidence, the perception of justice and the efficacy of the legal system within the community it serves is likely to be seriously undermined.<sup>43</sup>

<sup>43</sup> See, eg, J Bourke, “Misapplied Science” (1993) 10 *Australian Bar Review* 123, 125 n 13.

## PART 3

# THE COMMON LAW AND CALLS FOR REFORM

- 3.1 The current legal position, with respect to the second *Bonython* requirement,<sup>1</sup> is that, for expert evidence to be admissible in England and Wales, it must be “sufficiently well-established to pass the ordinary tests of relevance and reliability”.<sup>2</sup> That is to say, the expert witness’s evidence must be sufficiently reliable to be fit for a jury to consider.<sup>3</sup>
- 3.2 In *Luttrell*<sup>4</sup> the Court of Appeal expressly rejected the proposition that there is a preliminary requirement, for expert evidence to be admissible, that “the methods used are sufficiently explained to be tested in cross-examination and so to be verifiable or falsifiable”.<sup>5</sup> It was accepted, however, that the trial judge could properly consider methodology when determining whether to exclude admissible prosecution expert evidence under section 78(1) of the Police and Criminal Evidence Act 1984;<sup>6</sup> and the Court confirmed that an expert’s evidence could be ruled inadmissible on the ground that its “probative force is too slight to influence a decision”.<sup>7</sup>
- 3.3 In a trial on indictment (in the Crown Court), if the judge concludes that the tendered evidence is sufficiently reliable to be considered (and ultimately accepted) by the jury, then it is admissible. The actual reliability of the evidence will be determined by the jury in the light of cross-examination of the witness and any contradictory expert evidence adduced by the opposing party.<sup>8</sup> It follows that expert (scientific) witnesses must “furnish the court with the necessary scientific criteria for testing the accuracy of their conclusions, so as to enable the judge or jury to form their own independent judgment by the application of these criteria to the facts proved in evidence”.<sup>9</sup>

<sup>1</sup> Paragraph 1.2(2) above.

<sup>2</sup> *Dallagher* [2002] EWCA Crim 1903, para 29, approving a comment in *Cross and Tapper on Evidence* (9th ed, 1999), p 523, that “so long as the field is sufficiently well-established to pass the ordinary tests of relevance and reliability, then no enhanced test of admissibility should be applied”. This is repeated in the 10th edition (2004) at p 571. See also *Luttrell* [2004] EWCA Crim 1344, para 37.

<sup>3</sup> *Ciantar* [2005] EWCA Crim 3559, para 25.

<sup>4</sup> [2004] EWCA Crim 1344.

<sup>5</sup> Above, para 34.

<sup>6</sup> Above, para 34.

<sup>7</sup> Above, para 35.

<sup>8</sup> Where an expert has been called by the prosecution to give an opinion on an issue which the prosecution has to prove, the jury has to be sure beyond reasonable doubt that the opinion is correct before relying on it; see *Platt* [1981] *Criminal Law Review* 332.

<sup>9</sup> *Gilfoyle (No 2)* [2001] 2 Cr App R 5 (57), para 24, following the Scottish case of *Davie v Edinburgh Magistrates* 1953 SC 34, 40.



- 3.4 There is, however, little judicial guidance, and certainly no consistent guidance, on how sufficiency of reliability is to be determined for expert evidence at the admissibility stage.
- 3.5 The Court of Appeal attempted to establish a framework in *Gilfoyle (No 2)*,<sup>10</sup> where it was observed, with reference to the decision of the Court of Appeal for the District of Columbia in *Frye v United States*<sup>11</sup> (but without any assessment of the merits of the test established in that case), that expert evidence “based on a developing new brand of science or medicine is not admissible until accepted by the scientific community as being able to provide accurate and reliable opinion”.<sup>12</sup>
- 3.6 However, it is very difficult to reconcile the existence of a *Frye*-type barrier to the admission of novel or developing areas of scientific expertise in England and Wales with the judgment of the Court of Appeal in the earlier case of *Robb*<sup>13</sup> (where it was held that a “minority view” amongst phoneticians was admissible) or the established common law principle that there are “no closed categories where [expert] evidence may be placed before a jury” as it “would be entirely wrong to deny to the law of evidence the advantages to be gained from new techniques and new advances in science”.<sup>14</sup>
- 3.7 It is fair to say that the question whether a *Frye*-type test is to be applied in this jurisdiction has never been properly aired before the Court of Appeal. Accordingly, there is very little support for its existence in the case law.<sup>15</sup>

<sup>10</sup> [2001] 2 Cr App R 5 (57).

<sup>11</sup> 293 F 1013 (1923).

<sup>12</sup> [2001] 2 Cr App R 5 (57), para 25. The Court opined that the *Frye* test “accords with the English approach”. In *Frye v United States* 293 F 1013 (1923) it was said that a scientific theory “must be sufficiently established to have gained general acceptance in the particular field in which it belongs”.

<sup>13</sup> (1991) 93 Cr App R 161, 166.

<sup>14</sup> *Clarke* [1995] 2 Cr App R 425, 430, cited in *Dallagher* [2002] EWCA Crim 1903, para 27.

<sup>15</sup> The dictum in *Gilfoyle (No 2)* was cited with apparent approval in *Luttrell* [2004] EWCA Crim 1344, para 35, but we are not aware of any other support.

3.8 It has been suggested,<sup>16</sup> however, that the Court of Appeal's endorsement of the *Bonython* test<sup>17</sup> involves the "unwitting" acceptance of the *Frye* test, the argument being that the second *Bonython* requirement has been interpreted in this way in South Australia, by Sulan J, in the case of *Parenzee*.<sup>18</sup> We recognise that the Court of Appeal has on a number of occasions cited the *Bonython* test (including its second admissibility condition),<sup>19</sup> but, for the following reasons, we are not persuaded by this argument:

- (1) In reported cases following *Bonython*,<sup>20</sup> King CJ, the author of the *Bonython* test, did not expressly endorse the *Frye* test (and its requirement of "general acceptance in the particular field") but merely referred to a requirement of "accepted by experts ... as a scientifically established facet"<sup>21</sup> and "scientifically accepted body of knowledge".<sup>22</sup>
- (2) Australian jurisprudence has long accepted that a minority view in a recognised discipline can nevertheless be admissible as expert evidence, contrary to the demands of the *Frye* test.<sup>23</sup>
- (3) The Australian Law Reform Commission recently concluded that the *Bonython* test "points to acceptance by the *court* rather than by a professional community".<sup>24</sup>
- (4) There is nothing in the recent judgments of the Court of Appeal (in England and Wales) to suggest that this *Bonython* factor has been understood to require anything else in this jurisdiction. On the contrary: the Court of Appeal has recently reaffirmed its reluctance to recognise a barrier to novel areas of scientific expertise, expressly asserting, as a general proposition, that "developments in scientific thinking should not be kept from the court simply because they remain at the stage of a *hypothesis*".<sup>25</sup>

<sup>16</sup> A Roberts, "Drawing on Expertise" [2008] *Criminal Law Review* 443.

<sup>17</sup> Paragraph 1.2 above.

<sup>18</sup> [2007] SASC 143. The Law Reform Commission of the Republic of Ireland has also recently suggested that the "approach taken in the US in *Frye* ... also constitutes the test applied in *Bonython*", although this suggestion is then qualified in a footnote; see LRC CP 52-2008, *Expert Evidence*, para 2.392.

<sup>19</sup> Paragraph 1.2(2) above.

<sup>20</sup> (1984) 38 SASR 45.

<sup>21</sup> *Runjanjic* (1992) 56 SASR 114.

<sup>22</sup> C (1993) 60 SASR 467.

<sup>23</sup> See, in particular, *Commissioner for Government Transport v Adamcik* (1961) 106 CLR 292.

<sup>24</sup> ALRC Report No 102 (2006), para 9.33 (emphasis added).

<sup>25</sup> *Harris* [2005] EWCA Crim 1980, para 270 (misleading comma deleted, emphasis added).

- 3.9 It is also worth considering what was actually said in *Parenzee*.<sup>26</sup> Sulan J expressed the view<sup>27</sup> that the *Frye* test “necessitates the consideration of whether the [purported expert] witness ... is sufficiently related to the general body of knowledge in the field” and that this was “in accordance with” the second *Bonython* factor. Sulan J then went on to suggest that King CJ had “indicated” a test of “acceptance of a point of view by the general community of experts competent in the field”.<sup>28</sup>
- 3.10 There are three points to make about Sulan J’s observations:
- (1) his interpretation of what King CJ “indicated” is questionable, given that King CJ did not explicitly adopt the *Frye* test;
  - (2) he accepted<sup>29</sup> that there may be different tests depending on whether the purported expertise relates to an emerging field of knowledge or to a dissident opinion within a recognised field;
  - (3) he expressly *held*<sup>30</sup> that “ultimately, the level of acceptance of a witness’ evidence should not be determinative of the question whether that witness is qualified to give expert evidence” save that “those considerations are highly relevant to the weight to be given to the evidence”, which suggests that the *Frye* test does *not* form part of the law governing admissibility.
- 3.11 We should also point out that in *Gilfoyle (No 2)*<sup>31</sup> the Court of Appeal was under a misapprehension that the *Frye* test was still the “guiding principle” in the United States, when in fact, having been the subject of much criticism, it had already been superseded in the US federal courts, and in most state jurisdictions, by the different test found in rule 702 of the US Federal Rules of Evidence.<sup>32</sup>
- 3.12 The English common law position may therefore be summarised as follows:

<sup>26</sup> [2007] SASC 143.

<sup>27</sup> Above, paras 62 to 64.

<sup>28</sup> Above, para 68.

<sup>29</sup> Above, para 69.

<sup>30</sup> Above, para 74.

<sup>31</sup> [2001] 2 Cr App R 5 (57).

<sup>32</sup> Amended in 2000 to reflect the jurisprudence of the US Supreme Court in the 1990s. See also *Dallagher* [2002] EWCA Crim 1903, para 29.

- (1) Expert evidence is clearly inadmissible as a matter of law if, patently, it lacks even “prima facie reliability”.<sup>33</sup> Falling within this category would be the testimony of a “quack” or “charlatan”;<sup>34</sup> for example, it would not be permissible for an “expert astrologer” to give an opinion on human behaviour based on the position of the Sun, Moon and planets.<sup>35</sup>
  - (2) Equally clearly, there are some scientific theories or “laws” which are so well established that judicial notice may be taken of their validity and therefore reliability.<sup>36</sup>
  - (3) All other expert evidence is covered by the general relevance and reliability test.
- 3.13 With regard to the third category, which is where much forensic scientific expertise is likely to fall in practice, and assuming (as we do) that a *Frye*-type test is not part of English law, the trial judge has been provided with no guidance whatsoever to assist him or her in the determination of evidentiary reliability.
- 3.14 The criminal courts have instead adopted a policy of *laissez-faire*. In effect the courts permit the adduction of any expert evidence so long as it is not patently unreliable, so that juries are not denied access to evidence which might be helpful.

<sup>33</sup> See, eg, *Ciantar* [2005] EWCA Crim 3559, para 23. As noted in *Robinson* [2005] EWCA Crim 1940, para 19, evidence is inadmissible if a reasonable jury, properly directed as to its defects, would be unable to place any weight on it.

<sup>34</sup> *Robb* (1991) 93 Cr App R 161, 166.

<sup>35</sup> In *Robb*, above, at p 164, the Court of Appeal expressly recognised that “the evidence of an astrologer, a soothsayer, a witch-doctor or an amateur psychologist” was inadmissible. Note also in this context: *Ciantar* [2005] EWCA Crim 3559, para 28 (expert evidence may be *excluded* if it is exceptionally outlandish, or if it is given by an expert who is unacceptably confident or tentative); and *Gilfoyle (No 2)* [2001] 2 Cr App R 5 (57), para 25 (“unstructured and speculative conclusions are not the stuff of which admissible expert evidence is made”).

<sup>36</sup> For the more efficient use of court time and to ensure consistency of approach, the doctrine of judicial notice allows certain facts to be regarded as proved if the facts are so well known by people generally (or in the general locality) that it would be pointless to call evidence.

- 3.15 The absence of a clearly defined test for determining evidentiary reliability was recently recognised as a major failing by the House of Commons' Science and Technology Committee,<sup>37</sup> although the case for change had already been made by a number of commentators. Having considered the principal approach adopted in the United States (the *Daubert* test),<sup>38</sup> and heard evidence from academics and the Association of Chief Police Officers, the Committee concluded that the "absence of an agreed protocol for the validation of scientific techniques prior to their being admitted in court is entirely unsatisfactory" and found the idea of "an objective, clearly defined test to establish whether a theory or technique is sufficiently robust and evidence-based to merit admission in court" to be "highly attractive".
- 3.16 The Committee therefore recommended the development of a "gate-keeping" test for expert evidence which would be formulated "in partnership with judges, scientists and other key players in the criminal justice system, and should build on the US *Daubert* test".<sup>39</sup>
- 3.17 This paper is our contribution to this process.<sup>40</sup> We agree that the present test for determining the admissibility of expert evidence in criminal proceedings is far from satisfactory and that any reform will have to come from Parliament.<sup>41</sup>

<sup>37</sup> *Forensic Science on Trial*, Seventh Report (2004–2005) HC 96-1, pp 75 to 76 (25 July 2005).

<sup>38</sup> This test comprises the criteria formulated by the US Supreme Court in *Daubert v Merrell Dow Pharmaceuticals* 509 US 579 (1993) for determining the evidentiary reliability of scientific (or purportedly scientific) evidence. We describe the test in detail in Part 4 (see paras 4.41 to 4.85).

<sup>39</sup> *Forensic Science on Trial*, Seventh Report (2004–2005) HC 96-1, p 76. The "urgent" need to take forward this recommendation was recently made, judicially, by Weir J in *Hoey (Sean)* [2007] NICC at para 64. It has also been suggested in civil proceedings that there "may be merit in considering the approach of the courts in the United States of America as derived from *Daubert v Merrell Dow Pharmaceuticals* 509" (*Oldham Metropolitan Borough Council v GC* [2007] EWHC 136 (Fam), para 100, by Ryder J).

<sup>40</sup> Originally pursuant to the commitment set out in our Ninth Programme of Law Reform (2005), Law Com No 293, para 1.6. See now our Tenth Programme of Law Reform (2008), paras 3.18 to 3.23.

<sup>41</sup> See *Harris* [2005] EWCA Crim 1980, para 270, where the Court of Appeal expressly rejected a new approach on the basis that there "is no single test which can provide a threshold for admissibility in all cases".

# PART 4

## PROPOSALS FOR REFORM

### INTRODUCTION

- 4.1 Our basic premise is that expert evidence must satisfy a minimum standard of evidentiary reliability to be admissible in criminal proceedings, whether the party adducing it is the prosecution or the accused. Indeed, the common law, though vague in this area, already recognises that expert evidence of insufficient reliability should not be admitted.<sup>1</sup>
- 4.2 The question, then, is not *whether* there should be an admissibility threshold for expert evidence in criminal proceedings but: *what is the best way* to address the problem of determining sufficiency of evidentiary reliability?
- 4.3 We believe there are four realistic options:
- (1) *Exclusionary discretion without guidance.* Expert evidence would simply be treated like other evidence generally, so permission to adduce expert evidence could be refused if its probative value is outweighed by the danger that its admission would mislead, distract or confuse the jury.<sup>2</sup>
  - (2) *Exclusionary discretion with guidance.* Permission to adduce expert evidence could (again) be refused on the general ground that its probative value is outweighed by the danger that its admission would mislead, distract or confuse the jury, but specific guidance would be provided to assist the trial judge in his or her determination of reliability.
  - (3) *An admissibility rule requiring consensus amongst experts in the field.* This option would introduce a preliminary admissibility test for expert evidence which would equate evidentiary reliability with expert consensus. It would therefore be a *Frye*-type test.<sup>3</sup>

<sup>1</sup> Para 3.1 above. See *Ciantar* [2005] EWCA Crim 3559, paras 23 and 25.

<sup>2</sup> There is authority for the view that any evidence of low probative value may be described as “irrelevant” (and therefore ruled inadmissible) if there are good reasons for keeping it from the jury; see Appendix A. If there is such a power in criminal proceedings, for practical purposes it may be regarded as a common law exclusionary discretion, although it is unlikely that many trial judges would be willing to exclude defence evidence on this basis. Any admissible *prosecution* evidence may be excluded as a matter of judicial discretion, however, either at common law or by the application of s 78(1) of the Police and Criminal Evidence Act 1984.

<sup>3</sup> From *Frye v United States* 293 F 1013 (1923). See para 3.5 above.

- (4) *An admissibility rule requiring the trial judge to assess the evidentiary reliability of the tendered evidence.* In line with the recommendation of the House of Commons' Science and Technology Committee, this option would introduce a test to determine the validity of the methodology and any hypothesis underpinning the expert's evidence (that is, a *Daubert*-type test similar to rule 702 of the United States Federal Rules of Evidence).<sup>4</sup>

#### **OPTION 1: EXCLUSIONARY DISCRETION WITHOUT GUIDANCE**

- 4.4 The common law recognises that expert evidence is admissible as a matter of law only if it is "sufficiently well-established to pass the ordinary tests of relevance and reliability".<sup>5</sup> However, relevance can be determined only if it is first assumed or concluded that the evidence will actually provide the jury with assistance.<sup>6</sup> The validity of this assumption or conclusion depends, in turn, on an assumption or finding that the evidence is sufficiently reliable to be considered by the jury.
- 4.5 If it can be concluded that the tendered expert evidence *is* sufficiently reliable to be admitted and that it *would* provide the jury with assistance, it can properly be described as "logically relevant" and "reliable".<sup>7</sup>
- 4.6 In Appendix A to this paper we explain that there would also appear to be, in effect, a common law discretion to exclude any logically relevant evidence on the ground of "irrelevance". That is to say, there is authority for the view that the courts may hold that the probative value of an item of evidence is so low, when weighed against sound policy reasons for excluding it, that it ought not to be admitted.<sup>8</sup>
- 4.7 It follows that, in theory at least, expert evidence could be ruled inadmissible on the ground of "irrelevance" if the trial judge concludes that the evidence would provide the jury with *some* assistance but there are nevertheless countervailing considerations, carrying greater weight, which justify keeping the evidence from the jury. It might be said, therefore, that expert evidence is admissible in England and Wales only if the trial judge concludes that:

<sup>4</sup> Rule 702 was amended in 2000 in the light of the US Supreme Court's innovative interpretation of the original version of the rule in *Daubert v Merrell Dow Pharmaceuticals* 509 US 579 (1993) and *Kumho Tire Co v Carmichael* 526 US 137 (1999). However, as Redmayne points out, *Expert Evidence and Criminal Justice* (2001) p 101, the Supreme Court's approach was driven by civil "toxic tort" litigation and one should be cautious about drawing lessons for English criminal proceedings from case law which tends not to distinguish between civil and criminal litigation. The *Daubert* guidelines are summarised below at para 4.47.

<sup>5</sup> *Dallagher* [2002] EWCA Crim 1903, para 29. See also *Luttrell* [2004] EWCA Crim 1344, para 37.

<sup>6</sup> *Turner* [1975] QB 834, *Bonython* (1984) 38 SASR 45; see para 1.2(1) above.

<sup>7</sup> We mean reliable in the sense of being sufficiently reliable or trustworthy to be placed before the jury. (Actual reliability is a question of fact for the jury to determine.)

<sup>8</sup> It is unclear, however, how often this power is actually applied in criminal proceedings to exclude defence evidence.

- (1) it is sufficiently reliable to be admitted; and
  - (2) it would provide the jury with substantial assistance.<sup>9</sup>
- 4.8 If the courts were merely to be provided with a statutory reformulation of the common law admissibility test of “relevance and reliability” in tandem with the general exclusionary discretion, there would be no departure from the present common law position. Trial judges would still be “left with no choice but to muddle along as best they can, by eliciting such guidance as may be found in equivocal, and inconsistent, pronouncements of the Court of Appeal”.<sup>10</sup>
- 4.9 Nevertheless, an approach falling within the scope of this option was favoured by the Australian Law Reform Commission in 1985<sup>11</sup> and again in 2005<sup>12</sup> and 2006,<sup>13</sup> with particular reference to novel scientific evidence.<sup>14</sup> It is perhaps fair to say, however, that the question was not considered in great depth given that the Commission was addressing the law of evidence as a whole rather than the specific area of expert evidence.<sup>15</sup>

<sup>9</sup> Compare s 25(1) of New Zealand’s Evidence Act 2006: “An opinion by an expert that is part of expert evidence ... is admissible if the fact-finder is likely to obtain substantial help from the opinion ...”.

<sup>10</sup> Roberts and Zuckerman, *Criminal Evidence* (2004) p 323.

<sup>11</sup> ALRC Report No 26, Evidence, Vol 1, pp 195 to 196, 412, 415 to 416.

<sup>12</sup> ALRC Discussion Paper 69, pp 241 to 242.

<sup>13</sup> ALRC Report No 102, paras 9.33 to 9.43.

<sup>14</sup> Section 135 of the Evidence Act 1995 sets out a general discretion to exclude evidence on the ground that its probative value is substantially outweighed by the danger that the evidence might be unfairly prejudicial to a party or be misleading or confusing, a power that can be relied on to exclude expert evidence “that has not sufficiently emerged from the experimental to the demonstrable” (ALRC Report No 26, Evidence, Vol 1, p 412). For a similar analysis in the context of the US Federal Rules of Evidence, see CW Sharpe, “Reliability Under Rule 702: A Specialized Application of Rule 403” (2003) *Seton Hall Law Review* 289.

<sup>15</sup> Ostensibly, the approach in New Zealand and Canada might also be thought to accord with this approach, whereas in truth the law in these jurisdictions is closer to option 2 (Canada) or option 4 (New Zealand). In *Mohan* [1994] 2 SCR 9 the Canadian Supreme Court held that evidence based on a novel scientific theory or technique must be “subjected to special scrutiny to determine whether it meets a basic threshold of reliability” but was content to follow the traditional common law approach to admissibility (ie, relevant expert evidence will be excluded if “its probative value is overborne by its prejudicial effect ... 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”). In *J-LJ* [2000] 2 SCR 600, however, the Supreme Court referred with approval to the *Daubert* factors as a guide for determining whether evidence based on novel scientific theories or techniques was sufficiently reliable to be admitted. Section 25 of New Zealand’s Evidence Act 2006 does not include an explicit reliability test for expert evidence, but the New Zealand Law Commission envisages that the US *Daubert* guidelines will “continue to be important in the inquiry about reliability that is inherent in” the “substantial help” test now governing the admissibility of expert evidence (NZLC Report 55 (1999), Evidence Code and Commentary, Vol 2, p 59).



- 4.10 Be that as it may, we believe that the present common law approach, including the general discretion to exclude evidence on the ground of “irrelevance”, is an unsatisfactory basis for determining whether or not to admit expert evidence in criminal proceedings in England and Wales.
- 4.11 We agree that if “expert evidence is to play an important and valuable role in the trial, society needs to be confident that it is reliable, and that the processes by which it is adduced are fair and efficient”.<sup>16</sup> We believe that the general common law approach does not provide a fair and efficient test, particularly in the case of scientific or purportedly scientific evidence. This is evident from the recent miscarriages of justice outlined in Part 2 of this paper.
- 4.12 It is essential, in our view, that the trial judge should be properly equipped to address expert evidence with reference to appropriate reliability guidelines. In addition, the judge’s reasons for excluding (or admitting) expert evidence should be clearly set out with reference to those guidelines.
- 4.13 We therefore turn to the question whether the general exclusionary discretion allied with specific guidance for expert evidence would provide a satisfactory test.

#### **OPTION 2: EXCLUSIONARY DISCRETION WITH GUIDANCE**

- 4.14 This approach would be an improvement on the present common law position, and therefore on option 1, above, because the trial judge would at least have a proper, structured basis for determining the evidentiary reliability of expert evidence and for exercising his or her general exclusionary discretion. This would now seem to be the position adopted by the Canadian Supreme Court.<sup>17</sup>
- 4.15 This option for reform differs from option 4, below, because the guidance would be read alongside the general exclusionary discretion, and it is that discretion which would be applied to exclude the proffered evidence. There would be no separate admissibility test for expert evidence. It is for this reason that we do not support option 2.
- 4.16 First, the precise nature and scope of the power to exclude (or, technically, to render “inadmissible”) logically relevant evidence on the ground of “irrelevance” has never been satisfactorily addressed by the appellate courts in England and Wales. It is therefore a somewhat tenuous foundation upon which to build a new statutory test for expert evidence.

<sup>16</sup> D Ormerod and A Roberts, “Expert Evidence: Where Now? What Next?” (2006) 5 *Archbold News* 5.

<sup>17</sup> *Mohan* [1994] 2 SCR 9 and *J-LJ* [2000] 2 SCR 600.

- 4.17 Secondly, insofar as the courts do actually recognise the existence of the common law basis for exclusion, the test would appear to be a judicial *discretion* because the trial judge must focus on the specific factual matters relating to the case before the court. If the test does indeed involve the exercise of a discretion, the judge's decision on a particular item of evidence would be assessed on appeal by the conventional "*Wednesbury* criteria".<sup>18</sup> That is to say, so long as all relevant factors were taken into account and all irrelevant factors were disregarded, the decision to exclude (or admit) evidence on the ground that its probative value is (or is not) outweighed by countervailing considerations would be upheld unless it was a decision no reasonable judge could have reached.<sup>19</sup>
- 4.18 We accept that a broad *Wednesbury* approach to judicial discretion is the right – indeed the only feasible – test in relation to many rulings the trial judge will have to make on questions of evidence, including expert evidence, where the questions are specific to the facts of the case being tried (for example, whether a particular expert witness is biased or a particular expert witness's reasoning is logically applicable to the facts in issue).
- 4.19 The *Wednesbury* criteria cannot, however, be regarded as appropriate for the determination of the reliability of expert methodology which transcends the facts of the case (that is, questions concerning hypotheses, principles and general methodological techniques and procedures)<sup>20</sup> where the appellate court is at least as well placed as the trial court to address the issue.<sup>21</sup> As an American commentator has noted, "answers to questions about whether an area of scientific evidence has sufficient indicia of reliability to be admissible is more akin to a policy judgment than whether a preliminary fact specifically articulated in an evidentiary rule ... has been met".<sup>22</sup>

<sup>18</sup> From *Associated Provincial Picture Houses v Wednesbury Corporation* [1948] 1 KB 223, 229. Although this test was established in the context of judicial control over the actions of the executive, the same test, with the same name, is now frequently applied in criminal proceedings when assessing the way in which a judicial discretion has been applied.

<sup>19</sup> This is the test for assessing the court's use of the discretion to exclude prosecution evidence under s 78(1) of the Police and Criminal Evidence Act 1984; see, eg, *O'Leary* (1988) 87 Cr App R 387, *Christou* [1992] 3 WLR 228 and *Quinn* [1995] 1 Cr App R 480.

<sup>20</sup> See, eg, DL Faigman, "Mapping the Labyrinth of Scientific Evidence" (1995) 46 *Hastings Law Journal* 555, 574.

<sup>21</sup> We therefore disagree with the approach of the US Supreme Court in *General Electric Co v Joiner* 522 US 136 (1997) where it was held that the way the trial judge exercises his or her discretion when applying r 702 of the Federal Rules of Evidence can be interfered with on appeal only if the ruling was "manifestly erroneous" (the "abuse of discretion" standard).

<sup>22</sup> DL Faigman, "Appellate Review of Scientific Evidence Under *Daubert* and *Joiner*" (1997) 48 *Hastings Law Review* 969, 977.

- 4.20 Indeed it is fair to say that the appellate courts are *better* suited than trial judges to resolve questions relating to the evidentiary reliability of expert evidence. Appellate courts may be able to conduct a more thorough investigation into a particular hypothesis; and they can certainly provide specific guidance for particular types of evidence.<sup>23</sup>
- 4.21 Certainly the need for uniformity of approach in the criminal courts where general scientific hypotheses, theories and techniques are concerned militates against a broad discretionary test. Judgments of the Court of Appeal (and of the High Court) will amount to precedents to be followed by trial judges (and magistrates), at least until previously unavailable evidence is adduced to suggest that an appeal court's judgment was based on an incomplete or erroneous picture.
- 4.22 We conclude, therefore, that the trial judge's ruling on the admissibility of expert evidence which transcends the facts of the case should be regarded as the application of a *rule of law* rather than a judicial discretion. The Court of Appeal should be able to reconsider the ruling on appeal on that basis.
- 4.23 As we explained in a 1996 consultation paper:<sup>24</sup>

If the trial judge has a discretion, the Court of Appeal will not interfere with the exercise of this discretion unless the decision to admit the evidence could not have been taken by any reasonable trial judge, or was made without regard to relevant factors or with regard to irrelevant factors. If, however, the test has the status of a rule, the Court of Appeal may assess [the question] for itself.

- 4.24 In addition, if evidence is admissible subject to the court's exclusionary discretion, it is for the party objecting to the evidence to demonstrate why it ought not to be admitted. Presumably the same approach operates if a party raises the common law discretion to exclude logically relevant evidence on the ground of "irrelevance" (even though, technically, a ruling on relevance is a ruling on admissibility). That is to say, one would expect the party opposing the admission of logically relevant evidence to have to demonstrate why it should not be admitted.<sup>25</sup>

<sup>23</sup> See, eg, CB Mueller, "*Daubert* Asks the Right Questions: Now Appellate Courts Should Help Find the Right Answers" (2003) 33 *Seton Hall Law Review* 987, 1021.

<sup>24</sup> Previous Misconduct of a Defendant (1996), Law Commission Consultation Paper No 141, p 26.

<sup>25</sup> If, however, the dispute relates to the preliminary question of *logical* relevance, it is for the party tendering the evidence to demonstrate that it is indeed logically relevant to a matter in the proceedings; see *Bracewell* (1978) 68 Cr App R 44, 51.

- 4.25 We believe that expert evidence of questionable reliability should not be addressed in this way. Given the risks associated with expert evidence in criminal proceedings, if a party wishes to rely on evidence of questionable reliability it should be for *that* party to demonstrate that it is sufficiently reliable to be considered by a jury.<sup>26</sup>
- 4.26 The United States *Daubert* test<sup>27</sup> recognises this, as, it would seem, does the evolving *Daubert*-style approach in New Zealand.<sup>28</sup>

### OPTION 3: CONSENSUS AMONGST EXPERTS (DEFERENCE)

- 4.27 In *Frye v United States*<sup>29</sup> the Court of Appeal for the District of Columbia held in a very short and citation-free judgment that, to be admissible, a scientific theory underpinning an expert witness's evidence "must be sufficiently established to have gained general acceptance in the particular field in which it belongs". The US federal courts and most US states now use a different test – the *Daubert* test<sup>30</sup> – focusing on the reliability of the particular evidence being tendered, but the "*Frye* test" is still applied in a number of state jurisdictions.<sup>31</sup>

<sup>26</sup> An analogy can be drawn in this respect with the law governing the admissibility of confessions. In effect, it is for the party tendering a confession (under ss 76 or 76A of the Police and Criminal Evidence Act 1984) to prove that the confession is sufficiently reliable to be considered by the jury. If the confession is admitted, it is for the jury to determine whether it is in fact reliable and how much weight should be placed on it.

<sup>27</sup> According to the US Supreme Court in *Bourjaily v United States* 483 US 171 (1987), 175 to 176, it is for the party tendering the evidence to prove that the admissibility requirements have been met.

<sup>28</sup> New Zealand's Court of Appeal has stated, with regard to scientific evidence, that the subject-matter of the expert witness's opinion must be a sufficiently recognised branch of science at the time the evidence is given (*Accused* [1989] 1 NZLR 714, 720, following *B (an accused)* [1987] 1 NZLR 362, 367) and that an expert witness's opinion is inadmissible in the absence of "supporting literature or other verification of the pedigree" of the opinion (*Makoare* [2001] 1 NZLR 318, 324). The *Daubert* criteria, and other indicia of reliability, are now being used by trial judges in some cases when ruling on the admissibility of scientific evidence (see, in particular, *Calder* (1995) T154/9). As mentioned in fn 15, above, in its proposals which led to the enactment of the Evidence Act 2006, the New Zealand Law Commission stated that the *Daubert* guidelines would "*continue* to be important in the inquiry about reliability that is inherent in" what has become s 25(1) of the Act (NZLC Report 55 (1999), Evidence Code and Commentary, Vol 2, p 59, emphasis added). Importantly, in *Calder* (1995) T154/9, the High Court of New Zealand (Tipping J) held at p 7 that the party tendering the expert evidence "has the onus of persuasion".

<sup>29</sup> 293 F 1013 (1923).

<sup>30</sup> Paragraphs 4.41 to 4.47 below.

<sup>31</sup> For example, California, Illinois and New York.

- 4.28 The *Frye* test has been described as “a short-cut decision rule that allowed judges to avoid having fully to understand the proffered scientific evidence and, instead, admit evidence on the basis of whether it was generally accepted within the relevant field of study”.<sup>32</sup> In other words, where the test applies, the trial judge simply defers to the view of the relevant expert (scientific) community when determining whether expert (scientific) evidence should be admitted.
- 4.29 For a number of reasons we believe that a test along these lines would not provide a satisfactory response to the problem of unreliable expert evidence in criminal proceedings in England and Wales.
- 4.30 First of all, we believe it would be wrong *in principle* for the courts simply to defer to the view of a body of experts in the field as to admissibility. The responsibility for questions of admissibility should lie with the judiciary rather than non-judicial actors.<sup>33</sup>
- 4.31 Secondly, a deference test sets up a barrier to the admissibility of novel but inherently sound areas of scientific expertise, based on demonstrably valid methodology, merely because insufficient time has passed for there to be general acceptance in the relevant field.<sup>34</sup> The application of a *Frye*-type test would therefore prevent the adduction of evidence which is sufficiently reliable to be admitted, contrary to the interests of justice and, indeed, contrary to the compelling common law principle that it is “entirely wrong to deny to the law of evidence the advantages to be gained from new techniques and new advances in science”.<sup>35</sup>
- 4.32 A *Frye*-type test might, for example, have prevented the adduction of new scientific evidence undermining the established position that:
- (1) two or more unexplained infant deaths in the same family necessarily means that murder has been committed;<sup>36</sup>

<sup>32</sup> SJ Odgers and JT Richardson, “Keeping Bad Science out of the Courtroom” (1995) 18(1) *UNSW Law Journal* 108, 113.

<sup>33</sup> See, eg, E Beecher-Monas, “Blinded by Science” (1998) 71 *Temple Law Review* 55, 101, noting that under the *Frye* test it is “enough to obtain the approval of a cohort of the expert’s cronies willing to vouch for the technique”.

<sup>34</sup> See on this issue: PC Giannelli, “The Admissibility of Novel Scientific Evidence: *Frye v. United States*, a Half-Century Later” (1980) 80 *Columbia Law Review* 1197, 1205 and 1223; J Sanders, “The Merits of the Paternalistic Justification for Restrictions on the Admissibility of Expert Evidence (2003) 33 *Seton Hall Law Review* 881, 886; and SJ Odgers and JT Richardson, “Keeping Bad Science out of the Courtroom” (1995) 18(1) *UNSW Law Journal* 108, 114.

<sup>35</sup> *Clarke* [1995] 2 Cr App R 425, 430; *Dallagher* [2002] EWCA Crim 1903, para 27. Note, however, that the “time-lag” aspect of the *Frye* test can be defended on the ground that it may ensure that more is known about the technique in question so that the court is better placed to determine reliability, so long of course as the technique has been tested and corroborated during that period (see M Redmayne, *Expert Evidence and Criminal Justice* (2001) pp 108 and 115).

<sup>36</sup> Paragraphs 2.20 to 2.21 above.

- (2) a triad of intra-cranial injuries in an infant necessarily means that he or she was violently assaulted.<sup>37</sup>
- 4.33 Conversely, and thirdly, a deference test may give rise to problems with regard to determining the relevant field within which general acceptance has to be achieved and what precisely is meant by “general acceptance”. So, if a field is narrowly defined – to include only the expert in question and like-minded experts – the evidence will be admissible even though it is *not* based on sound methodology.<sup>38</sup>
- 4.34 Fourthly, a deference test would require a means by which to determine “general acceptance” in the relevant field. This might be established by calling additional expert witnesses or by referring to publications.<sup>39</sup> However, as one American commentator has explained,<sup>40</sup> this raises further questions relating to whether one or more expert witnesses’ testimony is a sufficient basis for determining general acceptance amongst the relevant community; and a search of the relevant literature in the field may itself be an unreliable basis for determining general acceptance.
- 4.35 Fifthly, and perhaps most importantly in practical terms, a deference test would fail to account for the phenomenon that much “knowledge” slips into general acceptance without any careful examination of the underlying methodology,<sup>41</sup> a problem which, as already explained,<sup>42</sup> may be particularly true for forensic scientific evidence relied on in criminal proceedings.
- 4.36 Under a deference test, so long as the expert evidence in question is not regarded as novel it is almost certain to be admitted, even though it may in fact be based on a shaky hypothesis or unreliable methodology.<sup>43</sup>
- 4.37 Finally, as explained below, our provisional view is that there is a better alternative.

<sup>37</sup> Paragraphs 2.22 to 2.24 above.

<sup>38</sup> See PC Giannelli, “The Admissibility of Novel Scientific Evidence: *Frye v. United States*, a Half-Century Later” (1980) 80 *Columbia Law Review* 1197, 1208 to 1211. See also P Roberts, “The Admissibility of Expert Evidence” (1996) 4 *Expert Evidence* 93, 94: “The notion of ‘community acceptance’ is inherently vague because it fails to specify the relevant communit(ies) whose acceptance is to determine admissibility, or to indicate how broadly-based community acceptance must be.”

<sup>39</sup> Or (eventually) by reference to the opinions of other judges.

<sup>40</sup> PC Giannelli, “The Admissibility of Novel Scientific Evidence: *Frye v. United States*, a Half-Century Later” (1980) 80 *Columbia Law Review* 1197, 1215–1218.

<sup>41</sup> See, eg: DL Faigman and others, “Check your Crystal Ball at the Courthouse Door, Please” (1994) 15 *Cardozo Law Review* 1799, 1811; and PC Giannelli, “The Admissibility of Novel Scientific Evidence: *Frye v. United States*, a Half-Century Later” (1980) 80 *Columbia Law Review* 1197, 1226 to 1228.

<sup>42</sup> Paragraph 2.26 above.

<sup>43</sup> See, eg, C Slobogin, “The Structure of Expertise in Criminal Cases” (2003) 34 *Seton Hall Law Review* 105, 106.

- 4.38 Accordingly, we do not propose that there should be an admissibility test for expert evidence based on general acceptance. Nor, for similar reasons, do we propose that there should be a variant of the general acceptance test, requiring nothing more than, say, “substantial acceptance”.<sup>44</sup>
- 4.39 We believe that if there is to be a “gate-keeping” role for the judiciary, with an admissibility test for expert witnesses’ evidence, then it should be a test which addresses the validity of the *principles and methodology* underpinning the expert testimony. In the words of the American College of Trial Lawyers, there should be “a single conceptual framework” for evaluating the admissibility of any type of expert evidence.<sup>45</sup> We acknowledge, however, that the reliability of different types of expertise may need to be assessed according to different guidelines.
- 4.40 We now examine our preferred option for reform, with particular reference to the recent jurisprudence of the United States Supreme Court.

#### **OPTION 4: JUDICIAL ASSESSMENT OF EVIDENTIARY RELIABILITY**

- 4.41 This is the position in the United States federal courts and most US state jurisdictions<sup>46</sup> by virtue of rule 702 of the Federal Rules of Evidence as amended (in 2000) in the light of the Supreme Court’s interpretation of the rule in *Daubert v Merrell Dow Pharmaceuticals*<sup>47</sup> and subsequent cases.<sup>48</sup> It seems, moreover, that a test of this sort is now part of the law of New Zealand.<sup>49</sup>
- 4.42 Under this test the trial judge is required to address the reliability of the evidence in question instead of simply deferring to the general view of experts in the field. The court is therefore fully accountable for its decision to admit or exclude any expert evidence tendered before it.

#### **Rule 702 and scientific evidence**

- 4.43 Rule 702 of the US Federal Rules of Evidence, as originally drafted, provided as follows:

<sup>44</sup> See, eg, JP Kesan, “An Autopsy of Scientific Evidence in a Post-*Daubert* World” (1996) 84 *Georgetown Law Journal* 1985, 1993.

<sup>45</sup> American College of Trial Lawyers, “Standards and Procedures for Determining the Admissibility of Expert Evidence After *Daubert*” (1994), p 7.

<sup>46</sup> For a recent list, see JA Moreno, “Eyes Wide Shut” (2003) 34 *Seton Hall Law Review* 89, n 2.

<sup>47</sup> 509 US 579 (1993).

<sup>48</sup> *General Electric Co v Joiner* 522 US 136 (1997) and *Kumho Tire Co v Carmichael* 526 US 137 (1999).

<sup>49</sup> As mentioned above: an expert witness’s opinion is inadmissible in New Zealand in the absence of “supporting literature or other verification of the pedigree” of the opinion (*Makoare* [2001] 1 NZLR 318, 324); the *Daubert* criteria, and other indicia of reliability, are now being used by trial judges in some cases when ruling on the admissibility of scientific evidence (see, in particular, *Calder* (1995) T154/9); and, in its proposals which led to the enactment of the Evidence Act 2006, the New Zealand Law Commission stated that the *Daubert* guidelines would “continue to be important in the inquiry about reliability that is inherent in” what has become s 25(1) of the Act (NZLC Report 55 (1999), Evidence Code and Commentary, Vol 2, p 59).

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

- 4.44 According to the Supreme Court in *Daubert v Merrell Dow Pharmaceuticals*,<sup>50</sup> in a judgment which focused solely on the reliability of expert *scientific* evidence, it was implicit in the rule's reference to "scientific ... knowledge" that the trial judge "must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable".<sup>51</sup>
- 4.45 This standard of evidentiary reliability was founded in the fact that the term "scientific" implies a grounding in the methods and procedures of science, and "knowledge" connotes more than subjective belief or unsupported speculation.<sup>52</sup> Thus, rule 702 assigned to the trial judge a "gate-keeping" role. The judge was duty-bound to ensure "that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand"<sup>53</sup> whether or not the hypothesis or theory relied on was established.<sup>54</sup>

This entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid<sup>55</sup> and of whether that reasoning or methodology properly can be applied to the facts in issue.<sup>56</sup>

<sup>50</sup> 509 US 579 (1993).

<sup>51</sup> 509 US 579 (1993), 589. It has been suggested that it is more appropriate to speak of "validity" than "reliability" in the context of scientific evidence; see, eg, B Black, "A Unified Theory of Scientific Evidence" (1988) 56 *Fordham Law Review* 595, 599 (the evidence is scientifically valid if it results from sound and cogent reasoning); and PC Giannelli, "The Admissibility of Novel Scientific Evidence: *Frye v. United States*, a Half-Century Later" (1980) 80 *Columbia Law Review* 1197, 1201 n 20 (for scientists, "validity" refers to the ability of a test procedure to measure what it is supposed to measure, whereas "reliability" is a reference to consistency). However, as the Supreme Court explained, at pp 590 to 591, n 9, its reference to reliability relates to *evidentiary* reliability (emphasis in original). We use the term "reliability" in this paper in the same way: the expert evidence must be sufficiently reliable (that is, sufficiently trustworthy) to justify being admitted before a jury.

<sup>52</sup> 509 US 579 (1993), 590.

<sup>53</sup> 509 US 579 (1993), 597.

<sup>54</sup> 509 US 579 (1993), n 11. The Court recognised, however, that well-established propositions are less likely to be challenged and that judicial notice may be taken of theories that are so firmly established as to have attained the status of a scientific law. Thus, in *USA v Plaza (Nos 1 and 2)* Cr No 98-362-10 (2002) judicial notice was taken of the uniqueness and permanence of fingerprints.

<sup>55</sup> See CT Hutchinson and DS Ashby, "Redefining the Bases for Admissibility of Expert Scientific Testimony" (1994) 15 *Cardozo Law Review* 1875, 1866: "[I]t is *how* conclusions are reached, not *what* the conclusions are, that makes them 'good science'" (emphasis in original).

<sup>56</sup> 509 US 579 (1993), 592 to 593. SJ Odgers and JT Richardson, "Keeping Bad Science out of the Courtroom" (1995) 18(1) *UNSW Law Journal* 108, 116 note that, as a result, "judges must come to some understanding of the history, philosophy and sociology of science, and of proper ways of doing science".



4.46 It is important to note that the Supreme Court explained that many factors would bear on this inquiry and expressly asserted that it was providing nothing more than some general observations, as opposed to a definitive checklist or test,<sup>57</sup> and that the inquiry envisioned by rule 702 was “a flexible one”.<sup>58</sup>

4.47 The Court’s observations were as follows:

- (1) ordinarily a key question is whether the theory or technique in question can be (and has been) tested;<sup>59</sup>
- (2) a further pertinent consideration is whether the theory or technique has been subjected to peer review and publication;<sup>60</sup>
- (3) in the case of a particular scientific technique, the court should ordinarily consider the known or potential rate of error and the existence and maintenance of standards controlling the technique’s operation,<sup>61</sup> and

<sup>57</sup> 509 US 579 (1993), 593.

<sup>58</sup> 509 US 579 (1993), 594, reaffirmed in *Kumho Tire Co v Carmichael* 526 US 137 (1999). Reliability guidelines had in fact already been laid down by judges in the United States and Canada in the years before *Daubert v Merrell Dow Pharmaceuticals*; see, in particular, *United States v Downing* 753 F.2d 1224 (1985) 1238–1239 (US Court of Appeals for the 3rd Circuit) and *Johnston* (1992) 69 CCC (3d) 395, 415 (Ontario Court (General Division)). CT Hutchinson and DS Ashby, “Redefining the Bases for Admissibility of Expert Scientific Testimony” (1994) 15 *Cardozo Law Review* 1875, 1909 to 1910 summarise the factors taken into consideration by American courts in the years before *Daubert*. These include: the qualifications and professional stature of the expert; the nature and breadth of the inference; the strengths of opposing views and the standing of the experts who express them; the non-judicial uses to which the technique has been put; the extent to which the expert is prepared to discuss uncertainties in the conclusions and techniques used; the novelty of the technique and its relationship to more established modes of scientific analysis; the extent to which the basic data are verifiable; and the availability of other experts to test and evaluate the technique. See also B Black, “A Unified Theory of Scientific Evidence” (1988) 56 *Fordham Law Review* 595, 642, referring to: the use made of the expert’s technique; the existence of specialised literature; and the extent to which the technique relies on the subjective interpretation of the expert.

<sup>59</sup> 509 US 579 (1993), 593. Karl Popper’s view (see, eg, *The Logic of Scientific Discovery*, 4th ed, 1980) was that the scientific method is underpinned by a principle of falsifiability or refutability; that is to say, generating hypotheses and testing them by experimentation or observation to see whether they are false (for the problem of induction holds that propositions as to the workings of the universe inferred from experience cannot be *proved* to be true). If a given hypothesis does not stand up to experimental scrutiny it will be reworked into a new hypothesis which will again be tested, and so on, producing successively better approximations to “truth”. A hypothesis which repeatedly withstands experimental scrutiny will be regarded as *corroborated* but not proven, and so come to be generally accepted by the relevant scientific community, perhaps achieving the grand status of a scientific “theory” or even a scientific “law”.

<sup>60</sup> 509 US 579 (1993), 593 to 594. The Court’s view was that, while submission to the scrutiny of the relevant scientific community is a component of good science, because (amongst other things) it increases the likelihood that substantive flaws in methodology will be detected, publication is not to be regarded as a necessary requirement of admissibility. An innovative but nevertheless well-grounded theory may not have been published.

- (4) widespread acceptance can be an important factor in ruling particular evidence admissible, and a known technique which has been able to attract only minimal support within the relevant scientific community may properly be viewed with scepticism.<sup>62</sup>
- 4.48 The Supreme Court also noted that “[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence”.<sup>63</sup> The suggestion, therefore, was that the adversarial trial process itself provided further safeguards for borderline evidence which, though sufficiently reliable to be admissible, was nevertheless “shaky”.
- 4.49 Although the Supreme Court recognised a robust test for governing the admissibility of expert opinion evidence, based on an assessment of the underlying methodology, it was intended to be a more flexible barrier than the *Frye* test, in line with the “liberal thrust” of the Federal Rules of Evidence.<sup>64</sup> But, as noted by a number of American commentators, the true position is a little more complex: “*Daubert* is more liberal when the expert evidence is solid, but on the cutting edge, and therefore not yet generally accepted. ... On the other hand, *Frye* is more liberal when what is offered is unsound expert evidence that nevertheless has become ‘generally accepted’ in its field.”<sup>65</sup>
- 4.50 It is probably fair to say that the *Daubert* test has been criticised and supported in equal measure. The critics have focused, principally, on three supposed failings:
- (1) the Supreme Court’s explanation of scientific methodology;
  - (2) the usefulness of peer review as a mechanism for ensuring evidentiary reliability; and
  - (3) the ability of the judiciary to apply the test in practice.

<sup>61</sup> 509 US 579 (1993), 594. See also: RN Jonakait, “The Meaning of *Daubert* and What that Means for Forensic Science” (1994) 15 *Cardozo Law Review* 2103, 2115: “Meaningful scrutiny of a technique should normally result in information about its error rate. A technique with an unknown error rate in all likelihood is a technique that has not been adequately tested.” See also CT Hutchinson and DS Ashby, “Redefining the Bases for Admissibility of Expert Scientific Testimony” (1994) 15 *Cardozo Law Review* 1875, 1896–1897: “Unlike falsifiability, which requires that the principles underlying the technique be valid, error rate analysis seeks to insure the validity of the technique itself and proper application of the technique in the given case.”

<sup>62</sup> 509 US 579 (1993), 594.

<sup>63</sup> 509 US 579 (1993), 596.

<sup>64</sup> 509 US 579 (1993), 588 to 589. See also *General Electric Co v Joiner* 522 US 136 (1997), 142.

<sup>65</sup> Faigman and others, “How Good is Good Enough?: Expert Evidence Under *Daubert* and *Kumho*” (2000) 50 *Case Western Reserve Law Review* 645, 656.

4.51 We address these criticisms below.<sup>66</sup>

### ***The scientific method***

4.52 The first *Daubert* criterion has been criticised on the largely theoretical, and we suggest unfounded,<sup>67</sup> ground that it fails properly to reflect the ongoing debate as to whether the theory of “falsifiability”<sup>68</sup> reflects the way scientists (or some scientists) actually go about their work in practice, now or historically.<sup>69</sup>

4.53 A closely related objection to the Supreme Court’s approach is that, given the immense diversity of activities subsumed under the concept of modern science, it might be better to talk of scientific *methods* for the various fields of scientific endeavour:<sup>70</sup>

*Daubert* expresses a clear bias in [favour] of the rigorous empirical methods of “hard sciences” ... [It] never mentions the psychological sciences, for example, where much of the data is subjective and many of the theories are empirically difficult, if not impossible, to verify. An experimental psychologist, for example, would demand “hard” evidence of the reliability of repressed memories, while a psychoanalyst might require much less or rely more heavily on anecdotal evidence.<sup>71</sup>

<sup>66</sup> Criticisms of the Supreme Court’s understanding of scientific methodology and the value of peer review are considered in the paragraphs which directly follow. The practical question whether the judiciary have been able to fulfil the obligations imposed on them by their gate-keeping role is addressed from para 4.70 onwards.

<sup>67</sup> See paras 4.55 to 4.60 below.

<sup>68</sup> See fn 59 above.

<sup>69</sup> For a summary, see G Edmond and D Mercer, “Keeping ‘Junk’ History, Philosophy and Sociology of Science out of the Courtroom” (1997) 20(1) *UNSW Law Journal* 48, 69 to 97. For other discussions, see S Jasanoff, “What judges should know about the sociology of science” (1993) 77 *Judicature* 77; RJ Allen, “Expertise and the *Daubert* Decision” (1994) 84 *Journal of Criminal Law and Criminology* 1157, 1171 to 1173; M Farrell, “*Daubert v Merrell Dow Pharmaceuticals, Inc*: Epistemology and Legal Process” (1994) 15 *Cardozo Law Review* 2183; A Schwartz, “A ‘Dogma of Empiricism’ revisited” (1997) 10 *Harvard Journal of Law & Technology* 149; DS Caudill and RE Redding, “Junk Philosophy of Science?” (2000) 57 *Washington & Lee Law Review* 685; J Beyea and D Berger, “Scientific Misconceptions Among *Daubert* Gatekeepers: The Need for Reform of Expert Review Procedures” (2001) 64 *Law and Contemporary Problems* 327; and S Jasanoff, “Law’s Knowledge: Science for Justice in Legal Settings” (2005) 95 *American Journal of Public Health*, Supplement 1, S49, S53 to S54.

<sup>70</sup> See G Edmond and D Mercer, “Keeping ‘Junk’ History, Philosophy and Sociology of Science out of the Courtroom” (1997) 20(1) *UNSW Law Journal* 48, 72. See also S Jasanoff, “Law’s Knowledge: Science for Justice in Legal Settings” (2005) 95 *American Journal of Public Health*, Supplement 1, S49, S54 (“scientific validity cannot be assessed in terms of a single, universally applicable criterion of good science”).

<sup>71</sup> PS Milich, “Controversial Science in the Courtroom” (1994) 43 *Emory Law Journal* 913, 917.

4.54 Thus, it has been argued that while the *Daubert* factors are useful for some, no doubt many, fields of science, different guidance is necessary for determining the reliability of the other fields<sup>72</sup> and for all non-scientific expertise. An example would be evidence relating to psychological syndromes based on a theory that cannot be tested, such as Freudian-based theories of psychoanalysis which claim to explain human behaviour after the event but cannot predict outcomes with an ascertainable degree of reliability.<sup>73</sup>

4.55 In our view, however, the controversy has been overstated, as another commentator explains:

The courts agree that *Daubert* governs all expert testimony, at least in the general sense that the trial court must scrutinize the reliability of all expert testimony. There is also agreement that an assessment of reliability must vary according to the type of testimony proffered. Some expert testimony will be more objectively verifiable, and subject to the expectations of falsifiability, peer review and publication. Other types of expert testimony will not rely on anything like a scientific method, and so will have to be evaluated by reference to other standard principles attendant to the particular area of expertise. ... If there is a well-accepted body of learning and experience in the field, then the expert's testimony must be grounded in that learning and experience to be reliable, and the expert must explain how her conclusion is so grounded. The more subjective and controversial the expert's inquiry, the more likely the testimony is to be excluded as unreliable.<sup>74</sup>

4.56 Furthermore, and we believe this to be the key point, the explanation of scientific methodology approved by the Supreme Court – that is, corroboration through testing – is without doubt the *best* basis for determining the evidentiary reliability of expert evidence which *can* be tested.

<sup>72</sup> As noted in the recent “shaken baby syndrome” case, *Harris* [2005] EWCA Crim 1980, at para 76, there is no scientific method of correlating the amount of force needed to cause the triad of injuries associated with non-accidental head injuries in infant children because “it is not possible to carry out experiments on living children”. See also *Cannings* [2004] EWCA Crim 1, para 142.

<sup>73</sup> See SJ Odgers and JT Richardson, “Keeping Bad Science out of the Courtroom” (1995) 18(1) *UNSW Law Journal* 108, 119 to 121. R Underwager and H Wakefield, “A Paradigm Shift for Expert Witnesses” (1993) 5 *Institute for Psychological Therapies Journal* (No 3), note that “[w]ith some variations, American psychiatry is, by and large, Freudian in its orientation” and that “wherever Freudian theory has been subjected to empirical tests, it has either failed or, at best, been inconclusive as a predictor of human behavior”. It is to be noted that Karl Popper did not regard Freudian psychoanalysis as science.

<sup>74</sup> DJ Capra, “The *Daubert* Puzzle”, (1998) 32 *Georgia Law Review* 699, 745 to 746. See also JA Moreno, “Einstein on the Bench?” (2003) 64 *Ohio Law Journal* 531, 534 to 537: “As a first step, we should avoid the temptation to treat all science as a single field, which strips away meaning and practical value. ... [T]here are, nevertheless, general standards applicable to all fields of science that distinguish genuine science from pseudo-science and quack science.”

- 4.57 The *Daubert* assessment of the scientific method is also the view generally favoured by scientists themselves (certainly the academic bodies representing scientists) for distinguishing between genuine science and pseudo-science. In *Daubert v Merrell Dow Pharmaceuticals*<sup>75</sup> the Supreme Court referred with approval to the *amicus* brief filed by RA Meserve and B Black for the American Association for the Advancement of Science and the National Academy of Sciences, setting out a view of scientific methodology in line with Karl Popper's view.<sup>76</sup>
- 4.58 Similarly, Professor Richard Dawkins<sup>77</sup> comments that individual scientists "at least pay lip-service to the idea that science advances by *disproof* of its hypotheses" and that "scientists ... gain prestige among their peers by publicly admitting their mistakes".<sup>78</sup>
- 4.59 The view of scientists themselves should be given considerable weight when formulating a test to determine the evidentiary reliability of scientific evidence. As Black and others point out: "[J]udges will accomplish the task of understanding science best if they look for the same traits that are important to scientists and if they rely on the same process of review that scientists use."<sup>79</sup>
- 4.60 Crucially, moreover, the sort of expert evidence tendered in criminal trials (in England and Wales) tends to be scientific or purportedly scientific evidence, rendering the *Daubert* criteria particularly important as a possible framework for an admissibility test for criminal proceedings in this jurisdiction.

<sup>75</sup> 509 US 579 (1993).

<sup>76</sup> 509 US 579 (1993), 590. See also: FJ Ayala and B Black, "Science and the Courts" (1993) 81 *American Scientist* 230; B Black, "The Supreme Court's View of Science" (1994) 15 *Cardozo Law Review* 2129; and, in particular, B Black and others, "Science and the Law in the Wake of *Daubert*: A New Search for Scientific Knowledge" (1994) 72 *Texas Law Review* 715, 753 to 786. The US District Court for the Middle District of Pennsylvania, when recently holding that "intelligent design" is not science but a religious alternative to the scientific theory of evolution, referred amongst other things to the fact that the hypothesis: had failed to gain acceptance in the scientific community; had not generated peer-reviewed publications; and had not been the subject of testing and research. The court noted that the scientific method "requires scientists to seek explanations ... based upon what we can observe, test, replicate, and verify". (See *Kitzmiller v Dover Area School District*, Case 4:04-cv-02688, 20 December 2005, pp 64 to 65.)

<sup>77</sup> Until recently, Professor of the Public Understanding of Science at Oxford University.

<sup>78</sup> Dawkins, *Unweaving the Rainbow* (Penguin, 2006) p 31 (emphasis in original).

<sup>79</sup> B Black and others, "Science and the Law in the Wake of *Daubert*: A New Search for Scientific Knowledge" (1994) 72 *Texas Law Review* 715, 753.

### **Peer review and publication**

- 4.61 The second of the *Daubert* criteria, the validity of peer review and publication as a quality control mechanism for scientific evidence, has also been called into question.<sup>80</sup>
- 4.62 However, in *Daubert* the Supreme Court itself acknowledged that peer review is not a panacea, holding that the fact of publication (or lack thereof) in a peer reviewed journal was nothing more than “a relevant ... *consideration* in assessing the scientific validity of a particular technique or methodology on which an opinion is premised”.<sup>81</sup> The Court rightly noted, moreover, that “submission to the scrutiny of the scientific community is a component of ‘good science’, in part because it increases the likelihood that substantive flaws in methodology will be detected”.<sup>82</sup>
- 4.63 The Supreme Court clearly intended that trial judges should use their own evaluation of peer review and publication as a tool for exploring whether flaws in methodology have been or could be exposed, with reference to the nature and quality of the peer reviewing process as applied to the evidence. Unfortunately, however, it may be that this is not what is happening in practice. According to one commentator, “peer review and publication has become a virtually meaningless *Frye*-type surrogate for real review with the mere fact of peer review, publication, or peer reviewed publication serving as a validity enhancer”.<sup>83</sup>

<sup>80</sup> See, eg, BS Koukoutchos, “Solomon Meets Galileo” (1994) 15 *Cardozo Law Review* 2237, 2246 to 2250 (noting at p 2248 that a “peer reviewer for even the most prestigious and influential medical and public health journals devotes an average of only a little over two hours to reviewing a manuscript”); S Jasanoff, “Law’s Knowledge: Science for Justice in Legal Settings” (2005) 95 *American Journal of Public Health*, Supplement 1, S49, S54 (noting that “methods of testing or peer review might be variable across disciplines, situation dependent, or influenced by interests” and that “much relevant scientific knowledge ... comes into being through the very action of the law”); and CT Hutchinson and DS Ashby, “Redefining the Bases for Admissibility of Expert Scientific Testimony” (1994) 15 *Cardozo Law Review* 1875, 1902 to 1903 (“rather than placing undue emphasis on the fact of publication, the courts should look closely at the results of peer review *after* publication”).

<sup>81</sup> 509 US 579 (1993), 594 (emphasis added).

<sup>82</sup> 509 US 579 (1993), 593. See also: CT Hutchinson and DS Ashby, “Redefining the Bases for Admissibility of Expert Scientific Testimony” (1994) 15 *Cardozo Law Review* 1875, 1904 (“Science evolves only by purging itself of misconceptions and errors, and peer review furthers this goal by policing scientific claims and insuring the widest possible dissemination for further testing and criticism”); and JA Moreno, “Eyes Wide Shut” (2003) 34 *Seton Hall Law Review* 89, 101 (“scientific journals reject a great deal of bad science” and generally “seek to publish experiments that are described in sufficient detail so that their results may be replicated”).

<sup>83</sup> JA Moreno, “Eyes Wide Shut” (2003) 34 *Seton Hall Law Review* 89, 98.

## Rule 702 and non-scientific evidence

- 4.64 In *Kumho Tire Co v Carmichael*<sup>84</sup> the Supreme Court held that the *Daubert* gate-keeping obligation applies to *all* expert evidence. This was a logical extension given that the trustworthiness of some non-scientific expert evidence may, if anything, be more suspect than scientific evidence as there may be fewer assurances of accuracy and truthfulness.<sup>85</sup> The trial judge must therefore determine whether any expert's testimony has a reliable basis in the knowledge and experience of the relevant discipline.<sup>86</sup>
- 4.65 Importantly, the Supreme Court reaffirmed that while the judge must perform a gate-keeping role to test the reliability of expert evidence, he or she is not duty-bound to consider any or any combination of the *Daubert* factors. The inquiry must be tied to the particular facts of the case and, in determining whether particular expert evidence is reliable, the judge should consider the specific *Daubert* factors only insofar as they are reasonable measures of reliability for the evidence in question:

[T]he factors identified in *Daubert* may or may not be pertinent in assessing reliability, depending on the nature of the issue, the expert's particular expertise, and the subject of his testimony.<sup>87</sup>

*Daubert* ... made clear that its list of factors was meant to be helpful, not definitive. Indeed, those factors do not all necessarily apply even in every instance in which the reliability of scientific testimony is challenged. It might not be surprising in a particular case, for example, that a claim made by a scientific witness has never been the subject of peer review, for the particular application at issue may never previously have interested any scientist. Nor, on the other hand, does the presence of *Daubert's* general acceptance factor help show that an expert's testimony is reliable where the discipline itself lacks reliability ... .<sup>88</sup>

<sup>84</sup> 526 US 137 (1999).

<sup>85</sup> See, eg, EJ Imwinkelried, "The Next Step After *Daubert*" (1994) 15 *Cardozo Law Review* 2271, 2279 to 2280.

<sup>86</sup> 526 US 137 (1999), 148, following *Daubert v Merrell Dow Pharmaceuticals* 509 US 579 (1993), 592.

<sup>87</sup> 526 US 137 (1999), 150.

<sup>88</sup> 526 US 137 (1999), 151.

At the same time ... *some* of *Daubert's* questions can help to evaluate the reliability even of experience-based testimony. In certain cases, it will be appropriate for the trial judge to ask, for example, how often an engineering expert's experience-based methodology has produced erroneous results, or whether such a method is generally accepted in the relevant engineering community. Likewise, it will at times be useful to ask even of a witness whose expertise is based purely on experience ... whether his preparation is of a kind that others in the field would recognize as acceptable.<sup>89</sup>

The objective ... is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field. ... [T]he trial judge ... should consider the specific factors identified in *Daubert* where they are reasonable measures of the reliability of expert testimony.<sup>90</sup>

- 4.66 In truth, however, the Supreme Court's test is not readily applicable to experience-based expertise where there is no recognizable field of expertise, either because the expertise itself is ad hoc<sup>91</sup> or because the type of expert evidence, though often freely admitted in criminal proceedings, has not been the focus of attention in the non-forensic context. An example of the latter, taken from American case law, is "drug jargon" expert testimony, that is, evidence from a police witness as to the meaning of particular words and phrases used by participants in drug-dealing, evidence grounded only in the witness's own on-the-job experience.<sup>92</sup>
- 4.67 Nevertheless, the drafters of the 2000 amendment to rule 702 specifically contemplated that judges would need to screen the reliability of experience-based expert evidence (such as "drug jargon" evidence), and the amended version of the rule does now address evidence of this sort.
- 4.68 Rule 702, as amended, now provides as follows:

<sup>89</sup> 526 US 137 (1999), 151.

<sup>90</sup> 526 US 137 (1999), 152. The Court held that the *General Electric Co v Joiner* 522 US 136 (1997) "abuse of discretion" standard of review, providing the judge with "broad latitude" when determining admissibility, applies to the judge's decision on whether the specific *Daubert* factors are, or are not, reasonable measures of reliability in the particular case.

<sup>91</sup> An "expert ad hoc" is an expert who has gained his or her expertise during the course of the investigation leading to the trial; see *Clare* [1995] 2 Cr App R 333.

<sup>92</sup> See JA Moreno, "What Happens When Dirty Harry Becomes an (Expert) Witness for the Prosecution?" (2004) 79 *Tulane Law Review* 1, 8: the *Kumho Tire* requirement that an expert should employ in court "the same level of intellectual rigor" as in his or her relevant field is impossible in this context because "drug jargon is not a legitimate field of study".



If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.<sup>93</sup>

- 4.69 According to the Note of the Advisory Committee on the Federal Rules of Evidence, with reference to the amended rule, “the witness must explain how [his or her] experience leads to the conclusion reached, why that experience is a sufficient basis for the opinion, and how that experience is reliably applied to the facts”.<sup>94</sup>

#### **The judicial application of a validity-based admissibility test**

- 4.70 Some commentators and practitioners have expressed reservations as to whether trial judges are able to understand and apply the *Daubert* factors in practice.<sup>95</sup> One view is that some judges have used, and will continue to use, the criteria as a mere checklist without examining the key question of evidentiary reliability and how the factors have a bearing on it.<sup>96</sup>

<sup>93</sup> For a summary of the deliberations preceding the amendment, see DJ Capra, “The *Daubert* Puzzle”, (1998) 32 *Georgia Law Review* 699, 763 to 767.

<sup>94</sup> See also JA Moreno, “What Happens When Dirty Harry Becomes an (Expert) Witness for the Prosecution?” (2004) 79 *Tulane Law Review* 1, 21 to 22, 29 to 30 and 54.

<sup>95</sup> In *Daubert v Merrell Dow Pharmaceuticals* 509 US 579 (1993), 599 to 601, Rehnquist CJ and Stevens J expressed, in dissent, their own concerns.

<sup>96</sup> See, eg: SJ Odgers and JT Richardson, “Keeping Bad Science out of the Courtroom” (1995) 18(1) *UNSW Law Journal* 108, 116 and 121 to 122; and JL Groscup and others, “The Effects of *Daubert* on the Admissibility of Expert Testimony in State and Federal Criminal Cases” (2002) 8 *Psychology Public Policy and Law* 339, 365 (concluding that judges understand the importance of *Daubert* but “pay only passing attention to the suggested criteria”).

- 4.71 Empirical support for this concern (in the United States) is provided by a recent national survey of 400 American state trial court judges.<sup>97</sup> The researchers conclude that the participating judges have hardly any understanding of the first and third of the *Daubert* factors (paragraph 4.47 above).<sup>98</sup> This suggests that the factors are neither accurately nor consistently being applied in the state courts which follow the guidelines.<sup>99</sup>
- 4.72 One commentator has opined, with some justification, that it “is difficult to reconcile [the American judges’] staggering levels of scientific ignorance with the increasing importance of science and technology to society and to law”.<sup>100</sup>
- 4.73 Nevertheless, the same research also shows that the participating judges overwhelmingly support their gate-keeping role (irrespective of the admissibility standard followed in their state)<sup>101</sup> and that 94 per cent of them find *Daubert* to be of value.<sup>102</sup>
- 4.74 Importantly, the judges who considered *Daubert* to be only of “some” value, rather than of “great” value, explained that while the guidelines provided a “good start at articulating a general framework for decision making” they were “not precise or specific enough to be truly helpful”.<sup>103</sup>
- 4.75 Notwithstanding their support for a judicial gate-keeping role, US judges therefore appear to be ill-equipped to perform the task assigned to them, through lack of education or training (or both). Indeed nearly half of the participating judges acknowledged that their education had left them inadequately prepared to deal with the range of scientific evidence being tendered for admission in their courts.<sup>104</sup>

<sup>97</sup> SI Gatowski and others, “Asking the Gatekeepers: A National Survey of Judges on Judging Expert Evidence in a Post-*Daubert* World” (2001) 25 *Law and Human Behavior* 433.

<sup>98</sup> Above, 444 to 447: only 4 per cent of the 352 participating judges who regarded falsifiability as a useful guideline demonstrated a true understanding of the concept; and only 4 per cent of the 364 participating judges who found the concept of error rates useful demonstrated a true understanding of it. The other two factors (peer review and publication) were better understood (at pp 447 to 448). This is perhaps unsurprising, for as one commentator notes, “peer review and publication, and general acceptance, are merely reiterations of the old *Frye* test” (E Beecher-Monas, “Blinded by Science” (1998) 71 *Temple Law Review* 55, 68).

<sup>99</sup> Above, 453. Note also MB Kovera and others, “Assessment of the Commonsense Psychology Underlying *Daubert*” (2002) 8 *Psychology, Public Policy and Law* 180, 186, pointing to research which suggests that judges without training in the scientific method cannot identify experts’ methodological shortcomings.

<sup>100</sup> JA Moreno, “Einstein on the Bench?” (2003) 64 *Ohio Law Journal* 531, 533.

<sup>101</sup> SI Gatowski and others, “Asking the Gatekeepers: A National Survey of Judges on Judging Expert Evidence in a Post-*Daubert* World” (2001) 25 *Law and Human Behavior* 433, 433 and 443.

<sup>102</sup> Above, 443: 55 per cent of participating judges reported that *Daubert* provides a great deal of value, with 39 per cent reporting that it provides some value.

<sup>103</sup> Above, 443.

<sup>104</sup> Above, 442.

4.76 It follows, then, that whilst the policy underpinning the gate-keeping role is sound, arguably the *Daubert* test is based on a false assumption about the ability of the judiciary to perform it:

[L]ay jurors should not be exposed to unfiltered scientific or technical testimony that may adversely influence their findings of fact. But this rationale is built on two underlying assumptions: (1) that the trial judge is more knowledgeable in assessing complex scientific testimony than is the average lay juror and (2) that each judge brings to the specific task of gatekeeping a general attitude or philosophy concerning the level of scrutiny appropriate for scientific gatekeepers.<sup>105</sup>

4.77 It has also been said that all four *Daubert* factors “have too often been deadweights woodenly applied, inert impediments to the development of a sophisticated approach by the courts to belief warrants for scientific evidence”.<sup>106</sup> This lack of expertise means that the judiciary may err on the side of caution and admit anything other than obviously unreliable conjecture.<sup>107</sup>

4.78 Indeed, because the American trial judge has a broad discretion as to the criteria to be taken into consideration in assessing the reliability of proffered expert evidence, much weight may (still) be attached to the fourth criterion so that the test, as applied in practice, may be indistinguishable from the *Frye* test.<sup>108</sup>

4.79 Nevertheless, we do not accept the argument that judges are not much more able than juries to appraise expert evidence (and that attempts to exercise a gate-keeping role therefore infringe on the powers and responsibilities of juries to act as fact-finders).<sup>109</sup>

<sup>105</sup> JT Walsh, “Keeping the Gate: the evolving role of the judiciary in admitting scientific evidence” (1999) 83 *Judicature* 140, 143.

<sup>106</sup> MP Denbeaux and DM Risinger, “*Kumho Tire* and Expert Reliability” (2003) 34 *Seton Hall Law Review* 15, n 70.

<sup>107</sup> See JA Moreno, “Einstein on the Bench?” (2003) 64 *Ohio Law Journal* 531, 548 and n 87.

<sup>108</sup> In this context it is worth noting the majority judgment of the US Supreme Court in *United States v Scheffer* 523 US 303 (1998) 309, holding that the absolute inadmissibility of polygraph (lie detector) evidence in US military courts was constitutional because, amongst other things, “the scientific community remains extremely polarized about the reliability of polygraph techniques”.

<sup>109</sup> The argument is summarised in this way, without approval, by CB Mueller, “*Daubert* Asks the Right Questions: Now Appellate Courts Should Help Find the Right Answers” (2003) 33 *Seton Hall Law Review* 987, 988.

- 4.80 For one thing, criminal trial judges are in a better position than juries to acquire and consider the kind of information that bears on the resolution of disputes about scientific and other expert evidence.<sup>110</sup> They also have considerable experience of adversarial presentations and are likely to be better able to understand the substance of expert testimony and its relationship to the issues. It should not be forgotten, moreover, that they are under an obligation to exclude unreliable and misleading evidence from the jury as part of their over-arching duty to protect the integrity and fairness of the trial process.
- 4.81 In any event, empirical research in the United States suggests, in line with what one would expect, that judges are *becoming* more sophisticated in their assessment of the reliability of expert evidence as they gain more experience.<sup>111</sup>
- 4.82 It may be the case, therefore, that the difficulties associated with the gate-keeping role in the United States have been exaggerated. One commentator notes that there are
- judges who apply *Daubert* routinely and well and whose rigorous standards should serve as a model to those overwhelmed by their gatekeeping responsibilities.<sup>112</sup>
- 4.83 The practical problems associated with a validity test for expert evidence cannot be regarded as an insurmountable obstacle to the introduction of a similar test in England and Wales, particularly as the trial judge is already under a duty, and must continue to be under a duty, to screen out insufficiently reliable expert evidence.
- 4.84 It must surely be better for trial judges to have clear, workable guidelines at their disposal rather than no guidelines at all. And if judges in England and Wales would find it difficult to use the guidelines to screen out unreliable expert evidence, then appropriate training should be provided.
- 4.85 Finally, it is pertinent to note that some judges in this jurisdiction are already making decisions on admissibility with reference to *Daubert*-style hallmarks of scientific validity.<sup>113</sup>

<sup>110</sup> A point made by B Black and others, "Science and the Law in the Wake of *Daubert*: A New Search for Scientific Knowledge" (1994) 72 *Texas Law Review* 715, 787.

<sup>111</sup> See J Sanders, "The Merits of Paternalistic Justification for Restrictions on the Admissibility of Expert Evidence (2003) 33 *Seton Hall Law Review* 881, 930 to 931 and 938.

<sup>112</sup> E Beecher-Monas, "Blinded by Science: How Judges Avoid the Science in Scientific Evidence" (1998) 71 *Temple Law Review* 55, 85. See also M Redmayne, *Expert Evidence and Criminal Justice* (2001) p 113: "the case law reveals some sophisticated applications of the *Daubert* criteria to complex evidence".

<sup>113</sup> See, eg, *Anstee* [2006] EWCA Crim 905, para 11, referring to the criteria of peer review and testing used by HHJ Inglis in an earlier case. Note also the view of Ryder J in *Oldham Metropolitan Borough Council v GC* [2007] EWHC 136 (Fam), para 100, that there "may be merit in considering the approach of the courts in the United States of America as derived from *Daubert v Merrell Dow Pharmaceuticals*".

## PART 5

# CONCLUSIONS

- 5.1 The present common law approach to the admissibility of expert evidence in criminal proceedings in England and Wales is unsatisfactory and should be replaced with a new statutory test.
- 5.2 A *Daubert*-style reliability test, in tandem with appropriate training for the judiciary and practitioners, offers the best mechanism for excluding unreliable expert evidence from criminal proceedings in this jurisdiction. We believe that:
- (1) it is the most appropriate test *in principle* for expert evidence tendered in criminal proceedings;
  - (2) the criticisms levelled against a test of this sort are unpersuasive; and
  - (3) none of the other viable alternatives would provide a satisfactory alternative to the present common law approach.
- 5.3 We set out our specific proposals in Part 6.

## PART 6

# PROPOSALS FOR CONSULTATION

- 6.1 In this Part we set out our provisional proposals aimed at ensuring that expert evidence will be admitted in criminal proceedings in England and Wales only if it is sufficiently reliable to be considered, and ultimately acted upon, by the jury.<sup>1</sup> Our proposals and comments are set out under the following four headings:
- (1) A “gate-keeping” role and reliability-based admissibility test
  - (2) The onus of persuasion
  - (3) Assistance from court-appointed assessors
  - (4) Education and accreditation
- 6.2 We should mention at the outset that our proposals would not require any fundamental changes to the law of criminal procedure. The current procedural framework and rights of appeal, which are summarised in Appendix B, would continue to operate and our proposals, if taken forward into law, would largely fit into this existing framework. There would need to be new procedural provisions only if, for trials on indictment in the Crown Court:
- (1) the question of evidentiary reliability of expert evidence would *always* have to be considered before the jury is sworn (with the possibility of an interlocutory appeal to the Court of Appeal);<sup>2</sup> and/or
  - (2) the judge were to be permitted to call upon an independent assessor to assist him or her in determining whether the expert evidence is sufficiently reliable to be admissible.
- 6.3 The questions we ask consultees to consider are set out on pages 71 and 72 below. The first set of questions relate to our proposals for reform. The second set of questions relate to the likely financial and social impact of our proposals if implemented. We do not make any specific proposals on whether the question of evidentiary reliability, and therefore admissibility, should always be decided before the jury is sworn (where there is to be a jury), but we would welcome consultees’ views on this option.

<sup>1</sup> Or the tribunal of fact in summary proceedings.

<sup>2</sup> As explained in Appendix B, it is already possible to lodge an interlocutory appeal to the Court of Appeal in relation to some rulings on the admissibility of evidence before the jury is sworn. If the admissibility of expert evidence were always to be determined at this preliminary stage in the proceedings, there would need to be a rule making this clear (largely within the existing procedural framework), rules relating to time limits for giving notice and serving reports and possibly a new interlocutory appeal procedure to allow the accused to challenge a ruling that defence expert evidence is inadmissible.

## PROPOSAL 1

### A “GATE-KEEPING” ROLE AND VALIDITY-BASED ADMISSIBILITY TEST

- 6.4 Our key proposal is that there should be an explicit “gate-keeping” role for the trial judge with a clearly-defined test for determining whether proffered expert evidence is sufficiently reliable (that is, sufficiently trustworthy) to be admitted.<sup>3</sup>
- 6.5 The application of this test would determine whether the tendered evidence is *admissible* as a matter of law. It would therefore be applied after the judge has provisionally concluded that the evidence is relevant and likely to be of assistance to the jury (on the assumption that it is reliable) but before he or she considers the application of any available discretion to exclude otherwise admissible evidence.<sup>4</sup>
- 6.6 Accordingly, as a general rule, and bearing in mind the provisional assumption of reliability, the trial judge would first need to determine whether the tendered expert evidence satisfies the following admissibility requirements:
- (1) Is the evidence logically relevant to a disputed matter?<sup>5</sup>
  - (2) Would the evidence provide the jury with substantial assistance?<sup>6</sup>
  - (3) Does the witness qualify as an expert in the field, and would he or she be able to provide an impartial opinion?<sup>7</sup>
- 6.7 The party tendering the evidence would therefore need to explain at the outset how the expert’s testimony is logically relevant to a matter in issue and demonstrate that it “is sufficiently tied to the facts of the case that it will aid the jury in resolving” it.<sup>8</sup> If the evidence fails this preliminary test it will be inadmissible.

<sup>3</sup> It is worth repeating the point made in Part 4 (fn 51) that we use the term “reliability” (rather than validity or viability) because we are referring to evidentiary reliability. The question is whether expert evidence is sufficiently reliable (in terms of trustworthiness) to be considered by the jury. We note that the Law Reform Commission of the Republic of Ireland has recently recommended that “a reliability test should be introduced as an additional requirement for admissibility of all expert testimony” in that jurisdiction. See LRC CP 52-2008, *Expert Evidence*, para 2.383.

<sup>4</sup> For example, s 78(1) of the Police and Criminal Evidence Act 1984 provides the court with a discretion to exclude any prosecution evidence if “it appears to the court that ... the admission of the evidence would have such an adverse effect on the fairness of the proceedings that the court ought not to admit it”.

<sup>5</sup> No evidence is admissible unless it is logically relevant to a disputed matter in the proceedings.

<sup>6</sup> See paras 1.2(1) and 4.7(2) above.

<sup>7</sup> See paras 1.2(3) and 1.3 above.

<sup>8</sup> *United States v Downing* 753 F 2d 1224 (3d Cir, 1985), 1242.

- 6.8 If, however, the preliminary test is passed, the judge would (generally) need to address the gate-keeping question, that is, whether the evidence is sufficiently reliable to be considered, and ultimately accepted, by a Crown Court jury. The test would encourage the judge consciously to examine the underlying methodology on which the expert relies.
- 6.9 The Court of Appeal in *Harris*<sup>9</sup> opined that there “is no single test which can provide a threshold for admissibility in all cases”. We accept that different *guidelines* are necessary for different types of expert evidence. Nevertheless it is possible to posit a generally applicable test which would ensure that any tendered expert evidence is adequately scrutinised before a final decision as to its admissibility is made.
- 6.10 We provisionally propose that there should be a statutory provision along the following lines:**
- (1) The opinion evidence of an expert witness<sup>10</sup> is admissible only if the court is satisfied that it is sufficiently reliable to be admitted.**
  - (2) The opinion evidence of an expert witness is sufficiently reliable to be admitted if:–**
    - (a) the evidence is predicated on sound principles, techniques and assumptions;<sup>11</sup>**
    - (b) those principles, techniques and assumptions have been properly applied to the facts of the case;<sup>12</sup> and**
    - (c) the evidence is supported by those principles, techniques and assumptions as applied to the facts of the case.**
  - (3) It is for the party wishing to rely on the opinion evidence of an expert witness to show that it is sufficiently reliable to be admitted.**
- 6.11 Thus, as explained in paragraph 6.8, above, the trial judge would not only consider the reliability of the expert’s hypothesis, methodology and assumptions; he or she would also examine how the expert has applied them to the case and, if properly applied, whether his or her conclusion is logically sustainable.

<sup>9</sup> [2005] EWCA Crim 1980, para 270.

<sup>10</sup> We use the term “expert witness” in a broad sense to encompass experts who provide live testimony in court and experts who provide evidence in the form of an admissible hearsay statement (under s 30 of the Criminal Justice Act 1988).

<sup>11</sup> That is, principles, techniques and assumptions which are not only logical and well-founded, but also appropriate for the type of evidence in question.

<sup>12</sup> As DJ Capra notes in “The *Daubert* Puzzle” (1998) 32 *Georgia Law Review* 699, 766, expert testimony based on sound principles is still unreliable if the principles are improperly applied.



- 6.12 The introduction of an explicit gate-keeping role for Crown Court judges would not necessarily lead to a sea change in English criminal proceedings, for we believe that much (but not all) expert evidence which is currently admitted would continue to be admitted.<sup>13</sup>
- 6.13 As noted by some American commentators with reference to forensic scientific evidence:
- Greater judicial inquiry need not ... lead to excluding scientific evidence. The objective of better informed verdicts will be furthered, however, if the parties know that the court will subject their experts to close scrutiny, and that when a party offers clearly invalid and unreliable science into evidence, the expert's testimony will be ruled inadmissible.<sup>14</sup>
- 6.14 Our proposed test would put experts on notice that they will be expected to provide the trial judge with evidence about the basis of their expert opinion sufficient to enable the judge to conclude that their evidence would provide the jury with dependable information.<sup>15</sup>
- 6.15 A test of this sort demands that expert witnesses called to testify on forensic scientific techniques must demonstrate that the techniques in question are a reliable basis for their opinion evidence. More to the point, it should ensure that convictions (and acquittals) are not based on unwarranted inferences drawn from unreliable evidence.
- 6.16 Importantly, the increased level of scrutiny which comes with an admissibility test focusing on the validity of the methodology and reasoning underpinning an expert's evidence should encourage higher standards, not only amongst experts themselves but also amongst scientists and technicians working in forensic laboratories.<sup>16</sup>

<sup>13</sup> According to the Advisory Committee on the Federal Rules of Evidence, in their note on the amended r 702, a "review of the case law after *Daubert* shows that the rejection of expert testimony is the exception rather than the rule".

<sup>14</sup> B Black and others, "Science and the Law in the Wake of *Daubert*: A New Search for Scientific Knowledge" (1994) 72 *Texas Law Review* 715, 788–789.

<sup>15</sup> See, eg, Faigman and others, "How Good is Good Enough?: Expert Evidence Under *Daubert* and *Kumho*" (2000) 50 *Case Western Reserve Law Review* 645, 657.

<sup>16</sup> See E Beecher-Monas, "Blinded by Science" (1998) 71 *Temple Law Review* 55, 102. See also C Slobogin, "The Structure of Expertise in Criminal Cases" (2003) 34 *Seton Hall Law Review* 105, 117, noting that the Supreme Court's interpretation of r 702 of the Federal Rules of Evidence stimulated efforts to validate the type of forensic expertise typically relied upon by the prosecution.

- 6.17 Our proposed test would comprise a three-stage process. The expert's evidence would need to pass stages (a), (b) and (c)<sup>17</sup> of the test to be admissible. However, this does *not* mean that the three-stage process would always need to be undertaken whenever expert evidence is tendered in a criminal trial. As we explain below,<sup>18</sup> judicial notice may be taken of the validity of much expert evidence without reference to the process we propose;<sup>19</sup> and, conversely, it may be possible to rule against the admissibility of some expert evidence without further enquiry on the ground that it is patently unreliable.
- 6.18 The central question in all cases where the process applies would be whether the expert's evidence is sufficiently reliable (that is, sufficiently trustworthy) to be admitted. The reliability of expert evidence, particularly scientific evidence, is better understood as a matter of degree rather than in absolute terms.<sup>20</sup> The question for the trial judge in practice, therefore, would be how to proceed from this consideration of the degree of reliability to the question whether or not to admit the evidence.
- 6.19 The decision would be reached by following guidelines relevant to the type of expert evidence being tendered for admission, the ultimate question being whether "sufficient assurances are present to warrant jury acceptance that the theory, as actually applied to the facts at hand, produces a correct result".<sup>21</sup>

**Stage (a): principles, methodology and assumptions**

- 6.20 The party tendering the evidence would need to demonstrate that the hypothesis, methodology and assumptions underlying the expert's opinion are sound. In the case of scientific evidence the party would of course need to refer to relevant, properly conducted empirical research.
- 6.21 The expert's hypothesis, methodology and assumptions would be *critically* examined with reference to guidelines relevant to the type of expertise being proffered. The trial judge would not, however, address the question whether the expert's opinion is in fact correct.

<sup>17</sup> Paragraph 6.10(2) above.

<sup>18</sup> See para 6.54 below.

<sup>19</sup> For the more efficient use of court time and to ensure consistency of approach, the doctrine of judicial notice allows certain facts to be regarded as proved if the facts are so well known by people generally that it would be pointless to call evidence on the matter.

<sup>20</sup> See, eg, JP Kesan, "An Autopsy of Scientific Evidence in a Post-*Daubert* World" (1996) 84 *Georgetown Law Journal* 1985, 2012; DA Nance, "Reliability and the Admissibility of Experts" (2003) 34 *Seton Hall Law Review* 191, 200 and JA Moreno, "Einstein on the Bench?" (2003) 64 *Ohio Law Journal* 531, 542 n 46.

<sup>21</sup> M Graham, "The Expert Witness Predicament" (2000) 54 *University of Miami Law Review* 317, 339.

- 6.22 We see no reason why guidelines should not be incorporated into legislation, possibly secondary legislation, for the principal types of expert evidence tendered in criminal proceedings, that is, scientific evidence and experience-based expert evidence.<sup>22</sup>
- 6.23 We do envisage, however, that the Judicial Studies Board in association with other professional bodies might wish to produce its own guide in due course (perhaps based on the US *Reference Manual on Scientific Evidence*).<sup>23</sup> Any such guide might address certain fields of expert evidence, such as statistical analysis, in more detail.
- 6.24 We set out in the following paragraphs our proposed guidelines for evaluating the reliability of scientific forensic evidence and experience-based forensic evidence.

***Scientific expert evidence***

- 6.25 If an expert witness expressly or impliedly asserts that his or her expertise is based on scientific methodology, or it is reasonable to conclude that the field of expertise is underpinned by a claim to scientific legitimacy, it is right in principle that the trial judge should first determine whether scientific methodology has been followed before allowing the expert's evidence to be admitted.
- 6.26 We provisionally propose a list of guidelines along the following lines for scientific (or purportedly scientific) expert evidence:**

- (1) In determining whether scientific (or purportedly scientific) expert evidence is sufficiently reliable to be admitted, the court shall consider the following factors and any other factors considered to be relevant:**
- (a) whether the principles, techniques and assumptions relied on have been properly tested, and, if so, the extent to which the results of those tests demonstrate that they are sound;<sup>24</sup>**
  - (b) the margin of error associated with the application of, and conclusions drawn from, the principles, techniques and assumptions;**
  - (c) whether there is a body of specialised literature relating to the field;**

<sup>22</sup> See, eg, RM Wise, "From *Price Waterhouse to Dukes* and Beyond" (2005) 26 *Berkeley Journal of Employment and Labor Law* 545, 577 to 580, suggesting more specific guidance in r 702 of the Federal Rules of Evidence to help judges determine whether the expert's methodology is internally valid and, if so, whether it can be generalised to the facts of the case.

<sup>23</sup> 2nd edition (2000), available on the Federal Judicial Center's website ([www.fjc.gov/library/fjc-catalog.nsf](http://www.fjc.gov/library/fjc-catalog.nsf)).

<sup>24</sup> For some of the indicia of "poor science" the trial judge should look out for, see Appendix D.

- (d) **the extent to which the principles, techniques and assumptions have been considered by other scientists – for example in peer-reviewed publications – and, if so, the extent to which they are regarded as sound in the scientific community;**<sup>25</sup>
- (e) **the expert witness’s relevant qualifications, experience and publications and his or her standing in the scientific community;**<sup>26</sup>
- (f) **the scientific validity of opposing views (if any) and the relevant qualifications and experience and professional standing in the scientific community of the scientists who hold those views; and**
- (g) **whether there is evidence to suggest that the expert witness has failed to act in accordance with his or her overriding duty of impartiality.**<sup>27</sup>

6.27 It would be for the trial judge to determine whether a field of expertise is to be classified as scientific (or purportedly scientific) and assessed in accordance with these guidelines.<sup>28</sup>

6.28 With regard to factor (a), the expert would need to show that the experimental or observational tests were conducted in an objective, scientifically valid way with appropriate comparators (for example, control groups) and safeguards (for example, measures to protect against contamination).

<sup>25</sup> JA Moreno, “Eyes Wide Shut” (2003) 34 *Seton Hall Law Review* 89, 99, notes that the court should address: “(1) the nature or quality of the peer review process; (2) the effect of peer review on the validity of the methods or conclusions contained in the published work; [and] (3) whether the validity of the published methods or conclusions is impacted by the manner in which this expert proposes to *use* the theory or technique to make inferences or draw conclusions”.

<sup>26</sup> In other words, outstanding qualifications may be said to provide circumstantial evidence of sound methodology (so long as the expert does not stray outside his or her area of expertise).

<sup>27</sup> Rule 33.2(1)–(2) of the Criminal Procedure Rules 2005. This factor is different from the admissibility criterion mentioned in para 6.6(3) above.

<sup>28</sup> See further para 6.67 below, where we ask whether the trial judge should exceptionally be able to call upon the assistance of an independent assessor to help him or her determine whether an expert witness’s evidence is to be classified as scientific (or purportedly scientific).

- 6.29 The expert would also need to show that any database relied on was sufficient in terms of size and quality to justify the nature and breadth of inferences drawn from it, that the inferences are logically sound and that alternative explanations were considered and properly discounted (if the data support a range of conclusions).<sup>29</sup> For example, there should be no unwarranted assumptions of causation from mere temporal proximity.<sup>30</sup>
- 6.30 We believe this list should provide sufficient guidance to allow the trial judge to determine the evidentiary reliability of any relevant expert testimony which purports to be scientific (including evidence falling within the social sciences).<sup>31</sup>
- 6.31 Before leaving scientific evidence, we should again consider the case of *Dallagher*.<sup>32</sup> Both parties on appeal in that case accepted that further research is needed to determine whether prints from more than one ear can show the same features. One of the experts called by D testified that there was not only a “paucity of relevant research” on the subject but also
- no peer review to support the conclusion that robust decisions can be founded on comparisons which in turn are critically dependent on the examiner’s judgment in circumstances where there are no criteria for testing that judgment.<sup>33</sup>
- 6.32 Nevertheless the Court of Appeal rejected the argument that expert opinion evidence of a positive ear-print comparison should not be given in the current state of knowledge,<sup>34</sup> an argument which was again rejected in *Kempster*.<sup>35</sup>

<sup>29</sup> See CT Hutchinson and DS Ashby, “Redefining the Bases for Admissibility of Expert Scientific Testimony” (1994) 15 *Cardozo Law Review* 1875, 1889 and 1895: the *Daubert* criterion of falsifiability means more than just testing; “it means reaching conclusions on the basis of *scientifically valid* reasoning” so the trial judge “must measure the evidentiary reliability of the expert’s opinion by the severity, diversity, and number of tests that corroborate the theory behind the expert’s opinion”. See also DL Faigman, “Making the Law Safe for Science” (1996) 35 *Washburn Law Journal* 401, 416: “judges must be prepared to exclude expert testimony based on shallow methods and superficial (or no) statistical analyses”.

<sup>30</sup> Sometimes referred to as the *post hoc ergo propter hoc* fallacy.

<sup>31</sup> J Monahan and L Walker, “Social Authority: Obtaining, Evaluating and Establishing Social Science in Law” (1986) 134 *University of Pennsylvania Law Review* 477, 499, suggest that the courts should accept the reliability of social science expert evidence to the extent that it is based on valid research methods, is supported by a body of other research, has survived the critical review of the relevant professional community and can be generalised to the facts of the case.

<sup>32</sup> [2002] EWCA Crim 1903.

<sup>33</sup> Above, para 11.

<sup>34</sup> Above, para 29.

- 6.33 Ear-print evidence tendered by the prosecution would be admissible in criminal proceedings under the test we are proposing only if the prosecution is in a position to demonstrate, with reference to our proposed guidelines, that it is sufficiently reliable to be considered and relied on by a criminal jury.

***Experience-based expert evidence***

- 6.34 It is equally possible to posit some general reliability guidelines for (non-scientific) experience-based expert evidence given in criminal proceedings by witnesses such as forensic accountants, lip-readers, handwriting examiners, literary critics<sup>36</sup> and ad hoc expert witnesses.<sup>37</sup>

**6.35 We provisionally propose the following guidelines:**

- (1) In determining whether experience-based expert evidence is sufficiently reliable to be admitted, the court shall consider the following factors (where applicable) and any other factors considered to be relevant:<sup>38</sup>**
- (a) the expert’s qualifications, practical experience, training and publications and his or her standing in the professional or other expert community;**
  - (b) the extent to which the basis and validity of the expert’s opinion can be explained,<sup>39</sup> with particular reference to:**

<sup>35</sup> [2003] EWCA Crim 3555, para 25, where the Court also rejected the proposition that if evidence of a positive comparison is given, it should be confined to an expression of opinion that the latent print is consistent with the impression taken from the defendant. More recently, in *Kempster (No 2)* [2008] EWCA Crim 975, it was held that an ear-print comparison is capable of providing information which could identify the person who left an ear-print on a surface, certainly where “minutiae” (small anatomical features such as notches and creases) can be identified and matched. However, it was accepted that in cases where the only information comes from “gross features” (the main cartilaginous folds) there is likely to be less confidence in a match between prints because of the flexibility of the ear and the uncertainty of the pressure applied, so gross features are capable of providing a reliable match only in cases where they “truly provide a precise match”.

<sup>36</sup> Admissible under the Obscene Publications Act 1959, ss 4(1)–(2).

<sup>37</sup> An “expert ad hoc” is an expert who has gained his or her expertise during the course of the investigation leading to the trial; see *Clare* [1995] 2 Cr App R 333.

<sup>38</sup> For example, it may be that an expert has lied about an important extraneous matter and thereby undermined his or her general credibility to such an extent that, for that reason, it would be too dangerous to allow the jury to rely on the evidence.

<sup>39</sup> See M Redmayne, *Expert Evidence and Criminal Justice* (2001) p 134.

- (i) the extent to which the basis of the opinion (for example, any assumption relied upon) has been verified or discredited;
  - (ii) the specific instances which support the claim to experience-based expertise;
  - (iii) the bearing those instances have on the matter(s) in issue;<sup>40</sup> and
  - (iv) whether the expert's methodology or reasoning has previously resulted in a demonstrably valid or erroneous opinion;
- (c) whether there is a body of specialised literature relating to the field of expertise and, if so:
- (i) the extent to which it supports or undermines the expert's methodology and reasoning; and
  - (ii) the extent to which the expert's methodology and reasoning are recognised as acceptable amongst his or her peers;
- (d) whether there is evidence to suggest that the expert has failed to act in accordance with his or her overriding duty of impartiality.<sup>41</sup>

6.36 For example, the reliability of an expert witness's testimony on forensic document examination (to determine whether or not a document is a forgery) would be determined on the basis of, amongst other things, the witness's experience, the number of standard points of comparison used and a detailed description of the process by which the expert reached his or her opinion.<sup>42</sup>

6.37 In the areas of professional but non-scientific expertise where there are well-accepted practices and methodologies, for example accountancy, it should be sufficient that the expert followed accepted practices and has provided a sufficient explanation of what was done.

<sup>40</sup> See generally EJ Imwinkelried, "The Next Step After *Daubert*" (1994) 15 *Cardozo Law Review* 2271, 2290 to 2294.

<sup>41</sup> Rule 33.2(1)–(2) of the Criminal Procedure Rules 2005.

<sup>42</sup> See DJ Capra, "The *Daubert* Puzzle", (1998) 32 *Georgia Law Review* 699, 739. See also M Redmayne, *Expert Evidence and Criminal Justice* (2001) pp 130 to 134 on the experience-based expertise of the witnesses in *Browning* [1995] *Criminal Law Review* 227 (92/6121/S2) who were called to give their opinion on whether certain photographic images showed a Renault 25 motor car.

### **Stage (b): application to the facts**

- 6.38 If the evidence falls at the first hurdle of the three-stage admissibility test the trial judge would rule that the evidence is inadmissible on the ground that it is insufficiently reliable to be considered by the jury. If, however, the initial reliability requirement is satisfied, the judge would move on to the second stage and examine the *application* of the (sound) methodology to the facts of the instant case.<sup>43</sup>
- 6.39 If the application of the methodology is so flawed that the expert's evidence should not be considered by the jury, then the judge would rule that it is inadmissible. An example would be where the expert's purportedly scientific analysis is riddled with factual inaccuracies and unwarranted assumptions.
- 6.40 The requirement of this part of the three-stage test would be satisfied, however, if there are no flaws in the application of the expert's (sound) methodology or there are only relatively minor flaws. Relatively minor flaws in the application of otherwise acceptable methodology should go to weight rather than admissibility.<sup>44</sup>

### **Stage (c): the expert's reasoning**

- 6.41 The third and final stage of the new admissibility test would require an examination of the reasoning underpinning the expert's conclusions to determine whether it is in fact logically in accordance with the proper application of sound principles, techniques and assumptions.
- 6.42 If, for example, the expert's conclusions amount to nothing more than speculation, uninformed by inferences which might reasonably be drawn from the proper application of his or her chosen methodology, then the judge would rule that the evidence is inadmissible under this part of the test.
- 6.43 In short, the trial judge would determine whether the scope of the expert's conclusions are logically in keeping with the methodology employed;<sup>45</sup> but, again, the judge would not address the question whether the expert's conclusion is actually correct for that would be to usurp the role of the jury.<sup>46</sup>

<sup>43</sup> See JA Moreno, "Beyond the Polemic Against Junk Science" (2001) 81 *Boston University Law Review* 1033, 1071 (footnotes omitted): "[J]udges must work to uncover mistakes in both the scientific methodology and its application to the particular facts of a case. Errors in either task make the resulting conclusions less valid."

<sup>44</sup> JP Kesan, "An Autopsy of Scientific Evidence in a Post-*Daubert* World" (1996) 84 *Georgetown Law Journal* 1985, 2020 to 2021 rightly makes the point that errors or shortcomings in the execution of the methodology will usually be a question of weight for the tribunal of fact, save that the execution of the methodology may be so flawed that the evidence should not be admitted.

<sup>45</sup> See JP Kesan, "An Autopsy of Scientific Evidence in a Post-*Daubert* World" (1996) 84 *Georgetown Law Journal* 1985, 2022.

<sup>46</sup> See CT Hutchinson and DS Ashby, "Redefining the Bases for Admissibility of Expert Scientific Testimony" (1994) 15 *Cardozo Law Review* 1875, 1866: "it is *how* conclusions are reached, not *what* the conclusions are, that makes them 'good science'" (emphasis in original).



### **Reviewing the ruling on appeal**

- 6.44 The ruling on admissibility would be a question of law and, as such, could be examined by the Court of Appeal (or the Queen's Bench Division of the High Court, following summary proceedings).<sup>47</sup>
- 6.45 We take the view that the judge's ruling on admissibility under the first stage of the test (stage (a)) should be approached by the appeal court as the application of a *rule of law*. By contrast, the judge's ruling under the second and third stages of the test (stages (b) and (c)) could properly be regarded as the exercise of a *judicial discretion* on admissibility governed by the criteria of the *Wednesbury* test.<sup>48</sup>
- 6.46 A broad discretionary approach to stages (b) and (c) would ensure that the Court of Appeal would not need to spend time and other resources reviewing matters which, ultimately, the trial judge was fully competent to determine for him or herself. Nevertheless, we appreciate that it may be unnecessary for the courts to make this distinction in practice and that the trial judge's ruling on admissibility could simply be looked at in the round, as HHJ Jeremy Roberts QC suggested when discussing this matter with us. Certainly the Court of Appeal is likely to be in as good a position as the trial judge to decide whether the tests in stages (b) and (c) have been satisfied.

### **Additional safeguards**

- 6.47 If the expert evidence is indeed sufficiently reliable to be admissible under the three-stage test, the trial judge would be able to consider his or her discretion to exclude admissible prosecution evidence under section 78(1) of the Police and Criminal Evidence Act 1984 (or its common law equivalent).<sup>49</sup> For evidence tendered by the accused, the judge could feasibly make a belated ruling that the evidence is "irrelevant" (and therefore inadmissible) on the ground that, notwithstanding its reliability, its probative value in assisting the jury is too slight when weighed against countervailing considerations.<sup>50</sup>

<sup>47</sup> See Appendix B.

<sup>48</sup> See para 4.17 above. We note that a hybrid approach of this sort, whereby the appellate court would consider anew a decision involving general scientific propositions but give the trial judge or magistrates greater discretion with regard to rulings relating to the particular facts of the case, accords with a recommendation made by the authors of "Confronting the New Challenges of Scientific Evidence" (1995) 108 *Harvard Law Review* 1481, 1529.

<sup>49</sup> See *Sang* [1980] AC 402.

<sup>50</sup> See para 4.7 above and Appendix A.

- 6.48 To avoid being excluded, the probative value of the expert evidence, prosecution evidence in particular, would need to be “sufficient to offset any unfair prejudice ... which might result from its reception, and its use in the trial must be consistent with an efficient allocation of resources; e.g. the evidence must be reasonably comprehensible to a ... jury, and its presentation will not be allowed to take up a disproportionate amount of court time”.<sup>51</sup>
- 6.49 We envisage that, if the evidence comprises an experience-based opinion which is of questionable validity, the judge would be entitled to exclude it (within the parameters of the *Wednesbury* test) if the party tendering the evidence could reasonably have tendered demonstrably valid expert evidence instead.<sup>52</sup>
- 6.50 If admitted, the expert’s evidence would of course be tested before the jury by “vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof”.<sup>53</sup>
- 6.51 If the judge rules that a particular expert’s evidence is sufficiently reliable to be admitted, but it subsequently transpires (during the course of the trial) that the evidence fails the sufficiency-of-reliability test, and therefore ought not to have been admitted, the judge will reverse his or her original ruling and direct the jury to disregard the evidence.<sup>54</sup> If this might be an ineffective measure, given the nature of the evidence presented before the jury and the interests of justice, it would be open to the judge to discharge the jury and order a new trial.<sup>55</sup>

<sup>51</sup> P Roberts, “The Admissibility of Expert Evidence” (1996) 4 *Expert Evidence* 93, 95. See also: *Melaragni* (1992) 73 CCC (3d) 348, 353; and SJ Odgers and JT Richardson, “Keeping Bad Science out of the Courtroom” (1995) 18(1) *UNSW Law Journal* 108, 126 to 127, citing, amongst other factors: “the likely capacity of the tribunal of fact to understand and assimilate the evidence without being misled or simply deferring to the expert opinion; the likely capacity of the tribunal of fact to properly determine the issue without the benefit of the expert opinion ... ; [and] the importance of the issue to which the evidence relates”.

<sup>52</sup> See: DA Nance, “Reliability and the Admissibility of Experts” (2003) 34 *Seton Hall Law Review* 191, 241 (the exclusion of unreliable expert evidence can be justified on the ground that the judge acts on the jury’s behalf to demand the best evidence that is readily available); and M Redmayne, *Expert Evidence and Criminal Justice* (2001), p 133 (the court should ask whether there is better evidence, that is, evidence based on a technique which has been tested and shown to be valid).

<sup>53</sup> *Daubert v. Merrell Dow Pharmaceuticals* 509 US 579 (1993), 596. Where an expert has been called by the prosecution to give an opinion on an issue which the prosecution has to prove, the jury has to be sure beyond reasonable doubt that the opinion is correct before relying on it; see *Platt* [1981] *Criminal Law Review* 332.

<sup>54</sup> See *Watson* (1980) 70 Cr App R 273, 276 where the Court of Appeal accepted, as a general principle, that “the judge has power to reconsider the question of the admissibility of evidence upon which he has already ruled”.

<sup>55</sup> See *Azam* [2006] EWCA Crim 161, para 48: “[A]s an integral part of his duty to ensure that a jury trial is fair, the judge retains, and where necessary should exercise, his discretionary power to discharge the jury ... he must make his own judgment whether the interests of justice in the particular case ... requires the discharge of the jury.”

- 6.52 We should add that in appropriate cases, where expert evidence is admitted notwithstanding lingering concerns as to its reliability, the interests of the other parties would be further safeguarded by an appropriate judicial direction to the jury on the factors affecting its reliability.<sup>56</sup>

## PROPOSAL 2

### THE ONUS OF PERSUASION

- 6.53 In any case where a party proposes to rely on expert evidence, any party against whom the evidence would be adduced should be entitled to raise the question of its evidentiary reliability as a preliminary issue, and the judge should be able to raise the question of his or her own motion.
- 6.54 If the question of reliability is raised, there would be three options:
- (1) The judge could take “judicial notice” of the (evidentiary) reliability of the theory or methodology if reliability has already been clearly established and there is no fresh evidence to suggest the contrary.<sup>57</sup> In such cases the opposing party’s objection would be regarded as manifestly unfounded and a pre-trial investigation into the validity of the theory or methodology would be unnecessary. Falling within this category of reliable evidence would be, for example, the theory that each human being is endowed with a unique set of fingerprints.<sup>58</sup>
  - (2) Conversely, the judge could rule that the tendered evidence is patently unreliable without the need for a forensic investigation and hold that it is inadmissible for that reason. This would be the appropriate approach if, for example, the “expert” in question was an astrologer called to give an opinion on human behaviour.<sup>59</sup>

<sup>56</sup> See *Luttrell* [2004] EWCA Crim 1344, paras 39 to 46.

<sup>57</sup> If the matter has been decided already by the Court of Appeal or High Court, and nothing new has come to light to suggest there should be a different approach, the trial judge’s decision not to re-open the question would be an application of the doctrine of binding precedent rather than the doctrine of judicial notice.

<sup>58</sup> Judicial notice was taken of the uniqueness and permanence of fingerprints in *USA v Plaza (Nos 1 and 2)* Cr No 98-362-10 (2002). See also the observation of the Canadian Supreme Court in *Trochym* [2007] 1 SCR 239, para 31:

Not all scientific evidence, or evidence that results from the use of a scientific technique, must be screened before being introduced into evidence. In some cases, the science in question is so well established that judges can rely on the fact that the admissibility of evidence based on it has been clearly recognized by the courts in the past.

<sup>59</sup> This accords with the law as it is now; see *Robb* (1991) 93 Cr App R 161, 164 (fn 35 in Part 3, above). Of course, it is extremely unlikely that evidence of this sort would be tendered in practice.

- (3) In all other cases the judge would investigate the evidentiary reliability of the proffered expert evidence in accordance with the three-stage test described above. The party tendering the evidence would need to demonstrate that the expert's hypothesis and methodology comprise a reliable basis for his or her expert testimony. The expert would have a duty to provide details of research findings which undermine the validity of his or her hypothesis or reasoning.<sup>60</sup>
- 6.55 We are aware that some commentators have expressed reservations as to the appropriateness of an evidentiary reliability test being applied to expert evidence tendered by the accused in criminal proceedings.<sup>61</sup> Nevertheless, we recommend that the same approach to admissibility should be adopted whether it is the accused or the prosecution who wishes to adduce expert evidence. Inherently unreliable but impressive-looking expert evidence, particularly pseudo-science, should not be placed before the jury whether the tendering party is the prosecution or the accused. That is to say, the accused in criminal proceedings should not be permitted to adduce any expert evidence in support of his or her defence merely because he or she is on trial. The accused is not – and should not be – permitted to distort the truth-seeking function of the trial process.<sup>62</sup>
- 6.56 For example, if D is charged with the murder of his infant child on account of (amongst other evidence) the presence of the classic triad of injuries associated with “shaken baby syndrome”,<sup>63</sup> it would be quite wrong if D were to be permitted to adduce evidence of a discredited hypothesis that the same triad of injuries could arise from non-traumatic natural causes.<sup>64</sup>
- 6.57 We propose that the party tendering the evidence, whether the prosecution or the accused, should have to demonstrate that it is sufficiently reliable to be considered by the tribunal of fact.**

<sup>60</sup> See generally: Criminal Procedure Rules 2005, r 33.2 and 3.

<sup>61</sup> See, eg, C Slobogin, “The Structure of Expertise in Criminal Cases” (2003) 34 *Seton Hall Law Review* 105, 118 to 119 and 124.

<sup>62</sup> See the majority judgment of the US Supreme Court in *United States v Scheffer* 523 US 303 (1998) 309, justifying the inadmissibility of evidence tendered by the defendant on the ground that governments “unquestionably have a legitimate interest in ensuring that reliable evidence is presented to the trier of fact in a criminal trial”, and noting that “the exclusion of unreliable evidence is a principal objective of many evidentiary rules”.

<sup>63</sup> Alternatively, “non-accidental head injury”.

<sup>64</sup> See *Harris* [2005] EWCA Crim 1980, paras 57 to 58 and 66 to 69 (on a hypothesis – “Geddes III” – now regarded as invalid, even by its proponent, and originally published merely to stimulate debate).

- 6.58 In any case where the judge undertakes an investigation into the evidentiary reliability of expert evidence pursuant to his or her gate-keeping role, it would be for the party tendering the evidence to demonstrate that the evidence is sufficiently reliable to justify the expert's opinion being placed before the jury. The party tendering the evidence would not need to show that the expert's hypothesis or opinion is actually *correct*.
- 6.59 We do not propose a specific "standard of proof" in this context, because it is inappropriate to consider a standard of *proof* other than in relation to the existence or non-existence of a fact, usually a disputed past fact. Here we are considering, not the establishment of a particular fact, which might be provable according to a standard set by law, but the *quality* of an expert's evidence with reference, principally, to the underlying methodology.
- 6.60 In short, the question whether or not an expert witness's evidence is sufficiently reliable to be admissible is not a fact which is susceptible of proof. Rather, it is more akin to the type of question which requires the judge to form a judgment in the light of all the available evidence, such as:
- (1) the question whether the admission of prosecution evidence "would have such an adverse effect on the fairness of the proceedings that the court ought not to admit it",<sup>65</sup> or
  - (2) the question whether or not the accused will receive a fair trial if he or she is to be tried many years after the time when the offence charged was allegedly committed.<sup>66</sup>
- 6.61 Nevertheless, the onus should be on the party wishing to rely on the expert evidence in question to persuade the judge that the evidence is sufficiently reliable to be admitted. In other words, where necessary,<sup>67</sup> the party tendering the evidence would have to adduce the evidence necessary to demonstrate that his or her expert's evidence is sufficiently reliable to be admitted, with reference to the relevant guidelines.

<sup>65</sup> Section 78(1) of the Police and Criminal Evidence Act 1984; see *R (Saifi) v Governor of Brixton Prison* [2001] 1 WLR 1134.

<sup>66</sup> See *S* [2006] EWCA Crim 756.

<sup>67</sup> It will often be unnecessary; see para 6.54 above.

- 6.62 It is worth repeating that we do not propose any concession in our test for evidence tendered for admission by the defence. Importantly, however, if an expert's evidence is admitted for the prosecution, the judge would still have to direct the jury that conclusions based on the evidence can be relied on only if the jury is sure beyond reasonable doubt that they are correct;<sup>68</sup> but if the expert evidence is adduced by the defence with a view to showing that the prosecution is unable to prove its case, the jury will be directed to acquit the accused if the evidence merely raises a reasonable doubt as to his or her guilt. Given this important difference between the status of prosecution and defence evidence, it may be the case under our proposals that, as a matter of practical reality, a trial judge would view defence expert evidence less critically than prosecution evidence when determining the question of admissibility.
- 6.63 Nevertheless, we believe it would be quite wrong to create different standards of reliability for prosecution and defence expert evidence. Our view is that the defence should not be able to divert the jury's attention from reliable prosecution evidence by being allowed to adduce inherently unreliable expert evidence which might give rise to an *unwarranted* (as opposed to a reasonable) doubt as to the guilt of the accused. We would particularly welcome consultees' views on this proposal.
- 6.64 Finally, it should be noted that if there is a ruling on the admissibility of expert evidence before it is adduced, in line with the test we propose, the judge will be fully equipped to provide the jury with a comprehensive direction on the evidence at the end of the trial, including guidance on all the factors which support or undermine its reliability.

#### **ASSISTANCE FROM COURT-APPOINTED ASSESSORS**

- 6.65 It would be for the trial judge to provide a reasoned decision on admissibility with reference to the criteria for assessing evidentiary reliability. Nevertheless, in determining whether expert *scientific* evidence is sufficiently reliable to be admitted, we see merit in an argument that the judge should exceptionally (that is, in cases where the evidence or field is particularly difficult) be permitted to call upon an independent assessor to provide him or her with assistance and guidance.<sup>69</sup> We suspect that trial judges would only rarely need, or wish, to seek such assistance in practice, but arguably the facility should be available for difficult types of evidence.
- 6.66 We do not formally propose in this paper that trial judges should be able to call upon independent assessors for assistance, but we would welcome consultees' views on the issue. This is because it is an option for reform we would like to consider in our final report on expert evidence. The sort of rule we have in mind would complement, and perhaps draw upon the language of, rule 33.7(1) of the Criminal Procedure Rules 2005. Rule 33.7(1) permits the judge to direct that expert opinion evidence for more than one co-accused be provided by a single joint (defence) expert.

<sup>68</sup> *Platt* [1981] *Criminal Law Review* 332.

<sup>69</sup> For an American perspective, see JA Moreno, "Beyond the Polemic Against Junk Science" (2001) 81 *Boston University Law Review* 1033, 1089 (on examples of neutral experts, and even a panel of neutral experts, being requested under r 706 of the Federal Rules of Evidence).

6.67 To assist consultees in their approach to this issue, we set out in the following paragraph a tentative version of the sort of rule which could be introduced, limited to Crown Court trials on indictment.

- (1) Where a party wishes to rely on expert scientific evidence (or expert evidence which is purportedly scientific), the court may call upon the assistance of an independent assessor to determine:
  - (a) whether the evidence is properly to be regarded as scientific (or purportedly scientific) evidence; and
  - (b) if so, whether the evidence is sufficiently reliable to be admitted.
- (2) An independent assessor is an expert selected by the court from a list prepared or identified by the parties or in such other manner as the court may direct.<sup>70</sup>
- (3) The court may call upon an independent assessor only in cases where the court could not reasonably be expected to determine the issues referred to in (1) without such assistance.

6.68 If a court-appointed assessor were to assist the judge in the determination of evidentiary reliability, natural justice would demand that the assessor's reasoning should be made available to the parties and that the parties should be able to question the assessor and comment on his or her views. It is worth stressing that the role of the assessor would *not* extend to providing an opinion on the relevant issue (the issue on which expert evidence is called by the party or parties) so there would be no risk of a conflict in this respect. The assessor's remit would be limited to the questions set out in paragraph 6.67(1) above. With regard to the second question (that is, (b)) the assessor would be able to comment on the appropriate guidelines, the validity of the expert's methodology and whether the expert's opinion follows logically from the data, but that would be the extent of his or her role.

6.69 In other words, the assessor would be able to provide the judge with guidance on the factors relevant to the question of evidentiary reliability; but, because the judge's role would be limited to ascertaining whether the expert's evidence is sufficiently reliable to be considered by the jury – rather than determining whether the evidence is *in fact* reliable or correct – the assessor would not be able to give his or her own view on whether the evidence is correct. That said, we accept that it would be possible to infer that an expert's evidence is incorrect in some cases, if the assessor provides a negative opinion on the expert's methodology or on the inferences drawn from the available data.

<sup>70</sup> The second limb of this proposal follows the test in r 33.7(2) of the Criminal Procedure Rules. We anticipate that the Forensic Science Regulator would be able to compile a list of experts who could be called upon to discharge the duties of a court-appointed assessor and that the parties or the court would be able to select a name from this list.

- 6.70 The question whether the evidence is sufficiently reliable to be admitted would in all cases be one of law. The trial judge would naturally treat with the greatest of respect the views of the assessor appointed to provide assistance, but the final judgment on the reliability question would remain an issue for the judge alone.
- 6.71 Because an assessor would be called upon to provide assistance only exceptionally, and because his or her function would be quite different from that of the expert witnesses called by the parties, we do not envisage any serious cost implications or practical difficulties. Nor do we envisage that a statutory provision permitting the judge to call upon an assessor in difficult cases would lengthen the proceedings. On the contrary, an independent assessor might be able to show that an expert's database is insufficient to justify inferences drawn from it or point to errors in methodology or reasoning. This would result in the evidence not being presented to the jury, on the ground that it is fundamentally flawed, thereby saving time and resources.

## **EDUCATION AND ACCREDITATION**

### **Education**

- 6.72 Although we make no specific proposals in this regard, we believe that judges (and criminal practitioners) should receive practical training on the methodology of science, the standards for determining the statistical significance of research findings and how to determine the reliability of experience-based expertise.<sup>71</sup>
- 6.73 This would not be an unduly burdensome programme for the judiciary. As one commentator explains, with particular reference to scientific evidence:

Judges do not need to be trained to become scientists, they need to be trained to be critical consumers of the science that comes before them. ... Judges need to know what critical questions to ask, they need to know what methodological and statistical issues scientific experts, and other purveyors of science, should address and comment on when proffering science for use in the court. Judges need to know what to listen and look for when expert evidence is presented and what they should be asking about when the information is not forthcoming.<sup>72</sup>

<sup>71</sup> See MB Kovera and others, "Assessment of the Commonsense Psychology Underlying *Daubert*" (2002) 8 *Psychology, Public Policy and Law* 180, 197 to 198, recommending an interdisciplinary scientific evidence class in law school, preferably taught by scientists and law lecturers, and judicial training so that lawyers and judges can distinguish between studies based on poor methodology and studies based on sound methodology.

<sup>72</sup> SI Gatowski and others, "Asking the Gatekeepers: A National Survey of Judges on Judging Expert Evidence in a Post-*Daubert* World" (2001) 25 *Law and Human Behavior* 433, 455.



- 6.74 The Judicial Studies Board might wish to work with relevant professional bodies with a view to producing for Crown Court judges a practical guide for assessing expert evidence in criminal proceedings, perhaps using parts of the US Federal Judicial Center's *Reference Manual on Scientific Evidence* as a framework.<sup>73</sup>

### **Accreditation**

- 6.75 Although we make no proposals in this respect, we accept that a scheme of compulsory accreditation or registration for expert witnesses in criminal proceedings could filter out *some* unreliable evidence at an early stage in the proceedings. A witness who has shown him or herself to be unreliable on one or more occasions, or deficient in his or her professional development, could lose his or her accreditation and thus be unable to testify again. No doubt a similar outcome would be achieved if accreditation were to become a requirement for the allocation of public funds from the Legal Services Commission. A failure to receive or maintain accreditation would prevent the expert from being able to provide expert testimony unless he or she was privately-funded or willing to provide a gratis opinion.
- 6.76 In isolation, however, we believe that a system of accreditation or registration would bring little if any additional benefit in terms of quality assurance. It might well also be impracticable, not to say unduly costly, given the wide variety of expert evidence tendered in criminal proceedings.<sup>74</sup>
- 6.77 Nevertheless, if a system of non-compulsory accreditation is encouraged, and the process of accreditation does indeed provide a further hallmark of reliability, there is no reason why the judge should not take into account, as an additional relevant consideration, the fact that an expert witness is or is not accredited when addressing the evidentiary reliability of his or her expert evidence.

<sup>73</sup> 2nd edition (2000), available on the Federal Judicial Center's website ([www.fjc.gov/library/fjc\\_catalog.nsf](http://www.fjc.gov/library/fjc_catalog.nsf)).

<sup>74</sup> The Legal Services Commission, in Part 2 of its Consultation Paper *The Use of Experts* (November 2004), proposes that experts who regularly provide forensic services should be quality assured (or accredited), principally by the Council for the Registration of Forensic Practitioners (the CRFP). The Commission notes, however, that the CRFP's resources are "limited and that they have a huge task" (para 6.8) and acknowledges that the compulsory registration of all expert witnesses is not practicable (para 6.14).

## PROVISIONAL PROPOSALS AND QUESTIONS

- 6.78 Do consultees agree with our provisional proposal that there should be a statutory test for the admissibility of expert evidence in criminal proceedings, as set out in paragraph 6.10 above?
- 6.79 Do consultees agree with our provisional proposal that trial judges should be provided with guidelines for determining the evidentiary reliability of scientific (or purportedly scientific) expert evidence, as set out in paragraph 6.26 above?
- 6.80 Do consultees agree with our provisional proposed guidelines for experience-based (non-scientific) expert evidence, as set out in paragraph 6.35 above?
- 6.81 Do consultees agree with our provisional proposal in paragraph 6.57 above that, where necessary, the party proposing to adduce expert evidence, whether the prosecution or a defendant, should have to demonstrate that it is sufficiently reliable to be placed before the jury?
- 6.82 Do consultees agree with our view that the other aspects of the present common law test governing the admissibility of expert evidence in criminal proceedings are satisfactory? (Paragraph 1.2(1) and (3) and paragraph 1.3 above.) If so, do consultees believe that these rules should be codified in primary legislation?
- 6.83 We would also welcome consultees' views on:
- (1) whether the trial judge should, in exceptional cases, be entitled to call upon an independent assessor to help him or her apply our proposed test for determining the reliability of expert evidence (paragraph 6.67 above);
  - (2) whether the question of evidentiary reliability should *a/ways* be decided before the jury is sworn, with the possibility of an interlocutory appeal to the Court of Appeal (paragraph 6.3 above; and see Appendix B).

## **IMPACT ASSESSMENT: ADDITIONAL QUESTIONS FOR CONSULTATION**

- 6.84 The following additional questions relate to the financial and social impact of our proposals, should they be carried forward into law. Before considering these questions, consultees will need to refer to Appendix C where we set out the various options for reform in a provisional impact assessment. We hope to be able to provide a more accurate picture of the implications of any recommendations we make in our final report, in the light of the responses we receive to these questions and our own further research.
- 6.85 Do consultees agree with our view that the potential costs of Option 4 are outweighed by the potential benefits, when compared with the cost / benefit analysis of doing nothing and of Options 1, 2 and 3?
- 6.86 Do consultees agree with our view that, in the medium to long term, the benefits of implementing Option 4 would outweigh the associated financial costs?
- 6.87 Do consultees consider that we have captured all the potential benefits and costs associated with our proposals for reform?
- 6.88 In addition, to enable us to assess more accurately the potential impact of our proposed reforms, we would welcome:
- (1) information which would allow us to estimate how many fewer wrongful convictions and acquittals there would be annually if Option 4 were to be implemented;
  - (2) views on the training implications of our proposals;
  - (3) information or views on the potential effect of our proposed reforms on investigators, including the police; and
  - (4) comments on the risks associated with our impact assessment.

# APPENDIX A

## RELEVANCE AND ADMISSIBILITY

### INTRODUCTION

- A.1 In this appendix we explain the extent to which the common law would currently seem to provide a mechanism for preventing the admission of evidence, including expert evidence, in criminal proceedings regardless of which party tenders it.<sup>1</sup>

### THE INADMISSIBILITY OF LOGICALLY IRRELEVANT EVIDENCE

- A.2 It is trite law that for evidence to be admissible, it must be logically relevant to a disputed issue of fact or a collateral fact<sup>2</sup> (or at least contribute to an explanation of the background of the case so that the disputed issues can be resolved in their proper context).<sup>3</sup>
- A.3 With regard to the concept of logical relevance, as the jurist James Thayer said over a century ago: “The law furnishes no test of relevancy. For this, it tacitly refers to logic and general experience.”<sup>4</sup>

### THE INADMISSIBILITY OF INSUFFICIENTLY PROBATIVE EVIDENCE

- A.4 The test of logical relevance will almost always be satisfied for any evidence tendered by the prosecution or defence, for it is highly unlikely that a party will wish to adduce evidence having no logical bearing on a matter in the proceedings.<sup>5</sup>

<sup>1</sup> In addition, there are common law and statutory powers to exclude *prosecution* evidence; see *Sang* [1980] AC 402 and s 78(1) of the Police and Criminal Evidence Act 1984, which provides as follows: “In any proceedings the court may refuse to allow evidence on which the prosecution proposes to rely to be given if it appears to the court that ... the admission of the evidence would have such an adverse effect on the fairness of the proceedings that the court ought not to admit it.”

<sup>2</sup> The term “collateral fact” is generally used to refer to the credibility of a witness or to a fact which must be proved as a condition precedent to the admissibility of other evidence.

<sup>3</sup> See now ss 100(1)(a), 101(1)(c) and 102 of the Criminal Justice Act 2003.

<sup>4</sup> JB Thayer, *A Preliminary Treatise on Evidence at the Common Law* (1898) p 265. For judicial dicta, see: *DPP v Kilbourne* [1973] AC 729, 756 (“relevant ... evidence is evidence which makes the matter which requires proof more or less probable”); *A (No 2)* UKHL 25, [2002] 1 AC 45 para 31 (“to be relevant the evidence need merely have some tendency in logic and common sense to advance the proposition in issue”); and *Guney* [1998] 2 Cr App R 242, 265 (“The question whether evidence is relevant depends not on abstract legal theory but on the individual circumstances of each particular case”). See also *Nethercott* [2001] EWCA Crim 2535, [2002] 2 Cr App R 7 (117) para 13, approving James Fitzjames Stephen’s definition in Article 1 of his *Digest of the Law of Evidence* (12th edn, 1946) p 4 (where “relevant” is said to signify that “any two facts to which it is applied are so related to each other that according to the common course of events one either taken by itself or in connection with other facts proves or renders probable the past, present, or future existence or non-existence of the other”).

- A.5 In this context it is worth noting that the test of logical relevance should be satisfied regardless of the extent to which the evidence in question makes the matter requiring proof more or less probable, for there are no degrees of logical relevance. By contrast, the cogency (or “weight” or “probative value”) of an item of evidence *is* a matter of degree.<sup>6</sup> It follows that an item of evidence may be logically relevant, and therefore satisfy the first precondition of admissibility, even though it has very little probative value or is superfluous in the context of the other evidence.<sup>7</sup>
- A.6 An important question, then, is whether the tribunal of law in criminal proceedings has a discretion to prevent the admission of an item of logically relevant evidence, regardless of the party tendering it, on the ground that it has minimal probative value or is superfluous.<sup>8</sup>
- A.7 It would seem that there is such a discretion at common law; but we also recognise that its existence may not be widely appreciated amongst practitioners. In addition, we suspect that it may only rarely be used in practice to exclude evidence tendered by the defence in criminal proceedings.

<sup>5</sup> However, tendered evidence may on occasion be held to be inadmissible on the ground of logical irrelevance, if the claim to relevance is based on a false premise; see *Bracewell* (1978) 68 Cr App R 44, 51.

<sup>6</sup> As explained by Fisher J in *Wilson* [1991] 2 NZLR 707, 711: “[A] fact is relevant if to even a minute degree its existence would make the fact in issue more or less likely. Whether its effect is strong or weak is more usually referred to as the ‘weight’ or ‘probative force’ of the evidence rather than its relevance.”

<sup>7</sup> As noted in *Cross and Tapper on Evidence* (10th ed, 2004) p 72, n 640, because relevance is a logical and not a pragmatic concept, for the purpose of determining logical relevance “each piece of evidence is to be considered independently, and a piece of evidence remains relevant however many other pieces of evidence are tendered to prove exactly the same fact”.

<sup>8</sup> In civil proceedings, r 32.1(2) of the Civil Procedure Rules 1998 now permits the tribunal of law to exclude any logically relevant evidence, as a matter of case management, to give effect to the overriding objective of dealing with cases justly.

### The modern case law

- A.8 The tribunal of law cannot admit an item of evidence which is not relevant to a matter in the proceedings. However, the case law suggests that this judicial duty not to admit “irrelevant” evidence has been broadened so as to become a judicial power or discretion to exclude logically relevant evidence – on the ground of “irrelevance” – if its probative value is slight and there are good reasons for keeping it from the tribunal of fact.<sup>9</sup> As Fisher J explained in the New Zealand case of *Wilson*:<sup>10</sup> “to understand the authorities it is important to appreciate that “relevant” is often given the secondary meaning of “of significant weight”.<sup>11</sup> To put it another way, “irrelevant” is often given the secondary meaning of “of insufficient weight”.
- A.9 What is in effect a common law discretion not to admit logically relevant evidence on the ground of insufficient probative value has been recognised in England and Wales in recent years, in the context of both civil and criminal proceedings.<sup>12</sup>
- A.10 In *Vernon v Bosley*<sup>13</sup> Hoffmann LJ summarised the position in the following terms:
- [A]lthough a judge has no discretion to exclude admissible evidence, his ruling on admissibility may involve a balancing of the degree of relevance [*sic*] of the evidence against other considerations which is in practice indistinguishable from the exercise of a discretion. ... A ruling on admissibility which involves a weighing of relevance [*sic*] against other factors should not be disturbed unless it involves some error of principle.”<sup>14</sup>

### Policy

- A.11 According to Fisher J in *Wilson*,<sup>15</sup> logically relevant evidence may be withheld from the tribunal of fact on the ground of “irrelevance” if justified by countervailing considerations of policy:

<sup>9</sup> For an academic discussion of this area, see, for example: GF James, “Relevancy, Probability and the Law” (1941) 29 *California LR* 689; HL Trautman, “Logical or Legal Relevancy – a Conflict in Theory” (1952) 5 *Vanderbilt LR* 385; MC Slough, “Relevancy Unravelling” (1956) 5 *Kansas LR* 1; LH Hoffmann, “Similar Facts after *Boardman*” (1975) 91 *Law Quarterly Review* 193, pp 204 to 206; and WO Weyrauch, “Law as Mask – Legal Ritual and Relevance” (1978) 66 *California LR* 699.

<sup>10</sup> [1991] 2 NZLR 707.

<sup>11</sup> [1991] 2 NZLR 707, 711.

<sup>12</sup> See, in particular, *Vernon v Bosley* [1994] PIQR 337, *Carter* (1996) 161 JP 207, 212 to 214 and *Blastland* [1986] 1 AC 41. According to Roberts and Zuckerman, *Criminal Evidence* (2004), p 104: “There is no doubt that judges can, and sometimes do, utilize the concept of legal relevance [ie, sufficiency of probative value] to filter out distorting or superfluous information from the trial.”

<sup>13</sup> [1994] PIQR 337.

<sup>14</sup> [1994] PIQR 337, 340. Relevant in this context is used to mean probative value.

<sup>15</sup> [1991] 2 NZLR 707.

[C]ompeting policy considerations can be taken into account. These include the desirability of shortening trials, avoiding emotive distractions of marginal significance, protecting the reputations of those not represented before the Courts and respecting the feelings of a deceased's family. None of these matters would be determinative if the evidence in question were of significant probative value. But if it is not, the proposed evidence can be excluded on the ground of "irrelevance".<sup>16</sup>

- A.12 Any jurisdiction has a finite number of courts and a finite amount of time to try each case; and human beings have a limited capacity for absorbing and digesting information. It is the reality of these constraints which requires a weighing of probative value against competing considerations to determine whether evidence ought to be admitted. Logically relevant evidence having little probative value could slow down the proceedings and raise costs to an unacceptable degree while contributing little or nothing<sup>17</sup> to the resolution of the dispute.<sup>18</sup> Alternatively, the evidence may create distress or vexation to one or more individuals which vastly outweighs its capacity to assist the jury in the resolution of the issues.
- A.13 The desirability of excluding relevant evidence on the ground that its admission is likely to distract the jury was recently acknowledged by the Court of Appeal (Criminal Division) in *Carter*.<sup>19</sup> However, the point was tacitly recognised in the earlier case of *Blastland*<sup>20</sup> where it was held, in effect, that logically relevant evidence may be withheld on the ground of "irrelevance" if its admission would provide nothing more than a basis for conjecture.

<sup>16</sup> [1991] 2 NZLR 707, 711. Much of this statement of the common law of New Zealand was approved by the English Court of Appeal in *Carter* (1996) 161 JP 207.

<sup>17</sup> Some evidence may be superfluous in the context of the other evidence which has been or will be admitted.

<sup>18</sup> See *Vernon v Bosley* [1994] PIQR 337, 339.

<sup>19</sup> (1996) 161 JP 207, 214.

<sup>20</sup> [1986] 1 AC 41.

# APPENDIX B

## PROCEDURE

### INTRODUCTION

- B.1 In this Appendix we briefly summarise the procedural context in which the criminal courts' revised "gate-keeping" role would be exercised, focusing in particular on the position for trials on indictment in the Crown Court.
- B.2 In short, our proposed approach to the determination of evidentiary reliability would be addressed in the procedural framework which currently exists. The Crown Court trial judge is already under a duty to ensure that only sufficiently reliable expert evidence goes before the jury, so the question of evidentiary reliability, if raised, already has to be determined following (where appropriate) the adduction of evidence, the questioning of witnesses and the consideration of legal submissions. In broad terms, the procedural framework which now exists to accommodate the determination of evidentiary reliability would not need to be altered.

### TRIALS ON INDICTMENT

- B.3 Prior to a trial on indictment, the admissibility of evidence, including expert evidence, may be addressed at a plea and case management hearing, a preparatory hearing or a pre-trial hearing.

#### **Plea and case management hearing (PCMH)**

- B.4 The question of evidentiary reliability is likely to be addressed for the first time at a plea and case management hearing (of which there may be more than one) following pre-trial disclosure of expert reports.<sup>1</sup> The purpose of a PCMH is to ensure that all steps necessary for the proper preparation for trial have taken place or are scheduled for future attention.
- B.5 If there is an issue as to the admissibility of expert evidence, the matter will be determined at a subsequent hearing in the absence of the jury (if one has been sworn). This may be a "preparatory hearing" or a "pre-trial hearing" or, if the issue is resolved during the course of the trial itself, a "*voir dire*" (trial-within-the-trial).

#### **Preparatory hearing**

- B.6 For complex, serious or lengthy cases, a "preparatory hearing" may be held, before the jury is sworn, under Part III of the Criminal Procedure and Investigations Act 1996.<sup>2</sup>

<sup>1</sup> See Part 24 of the Criminal Procedure Rules 2005.

<sup>2</sup> This must be for one of the purposes specified in s 29(2): identifying issues; or assisting the jury's comprehension of issues and expediting proceedings; or assisting the judge's management of the trial. It is also possible to hold a preparatory hearing in serious fraud cases under the Criminal Justice Act 1987.



- B.7 At this hearing, which forms the first stage of the trial, the judge – the trial judge – may make a ruling on “any question as to the admissibility of evidence” or “any other question of law relating to the case”.<sup>3</sup>
- B.8 In addition to an appeal against conviction once the trial has run its course,<sup>4</sup> section 35 of the 1996 Act provides that, with leave, an interlocutory appeal shall lie to the Court of Appeal from any such ruling. The Court of Appeal may confirm, reverse or vary the ruling.

### **Pre-trial hearing**

- B.9 If the case is not complex, serious or lengthy there may, nevertheless, be a “pre-trial hearing” before the jury is sworn under Part IV of the Criminal Procedure and Investigations Act 1996. Section 40(1) of the Act provides that, at a pre-trial hearing, a judge – not necessarily the eventual trial judge – may make a ruling on “any question as to the admissibility of evidence” or “any other question of law relating to the case concerned”.
- B.10 Generally speaking, it is not possible to lodge an interlocutory appeal to the Court of Appeal in relation to any ruling under section 40. The trial must run its course and any appeal will lie against conviction.<sup>5</sup> Importantly, however, section 58 of the Criminal Justice Act 2003 now permits the prosecution to lodge an interlocutory appeal against a ruling if the prosecution agrees that, if the appeal does not proceed or succeed, D would have to be acquitted of the offence(s) to which the ruling relates.<sup>6</sup>
- B.11 In addition, it should be noted that if sections 62 and 63 of the 2003 Act come into force, the prosecution will be able to lodge an interlocutory appeal in respect of any “qualifying evidentiary ruling” made before or during the trial.<sup>7</sup>

### **Trial-within-the-trial (“voir dire”)**

- B.12 It is also possible for the trial judge to rule on the admissibility of expert evidence after the jury has been sworn, but in its absence, following a trial-within-the-trial.
- B.13 The prosecution right of appeal provided by section 58 of the Criminal Justice Act 2003<sup>8</sup> also applies to rulings made during the course of the trial before the summing-up.<sup>9</sup>

<sup>3</sup> Criminal Procedure and Investigations Act 1996, s 31(3).

<sup>4</sup> Alternatively, where D is acquitted, the prosecution may refer a point of law to the Court of Appeal under the Attorney General’s reference procedure.

<sup>5</sup> Or, as explained above, the Attorney General may refer a point of law.

<sup>6</sup> See ss 58(8) and (9) of the 2003 Act. Section 58(13) provides that the power to appeal under s 58 applies to pre-trial rulings as well as to rulings made during the trial.

<sup>7</sup> In brief, the prosecution will be able to appeal under s 62 if the evidentiary ruling – or two or more such rulings taken together – significantly weakens the prosecution case in relation to the offence(s) which are the subject of the appeal. A ruling may be the subject of an appeal under s 58, notwithstanding that it might also fall under s 62 and that s 62 is not in force, provided that the prosecution accepts that if it loses the appeal then D will be acquitted: Y [2008] EWCA Crim 10, [2008] 1 WLR 1683.

## **SUMMARY PROCEEDINGS**

- B.14 The evidentiary reliability of expert evidence may occasionally arise during proceedings in a magistrates' court (or on appeal from a magistrates' court to the Crown Court).<sup>10</sup> If this happens in a magistrates' court, a professional District Judge is likely to be allocated the case, rather than a bench of lay magistrates. It is possible for a magistrates' court to consider the admissibility of expert evidence during the summary trial itself or at a pre-trial hearing.<sup>11</sup>
- B.15 Where a ruling on the admissibility of expert evidence has been made during summary proceedings, either party may challenge the ruling on the ground that it is wrong in law or is in excess of jurisdiction by applying to the court to state a case for the opinion of the High Court.<sup>12</sup> In addition, rulings in summary proceedings are subject to judicial review by the High Court. An application for judicial review may be brought on the grounds of error of law, excess of jurisdiction or breach of natural justice.

<sup>8</sup> Paragraph B.10 above.

<sup>9</sup> Section 58(13) of the Criminal Justice Act 2003. When ss 62 and 63 of the Act come into force there will be an additional avenue of appeal for the prosecution in relation to evidentiary rulings made before the opening of the case for the defence.

<sup>10</sup> If D is convicted by a magistrates' court following a plea of not guilty, D may appeal to the Crown Court where the case will be re-heard (without a jury). See Magistrates' Courts Act 1980, s 108.

<sup>11</sup> On pre-trial hearings, see Magistrates' Courts Act 1980, ss 8A and 8B.

<sup>12</sup> Appeal by way of case stated; see Magistrates' Courts Act 1980, s 111.

## APPENDIX C

### IMPACT ASSESSMENT

- C.1 In this Appendix, we address the potential social and economic impact of our provisional proposals. We start by summarising the problem and try to give some idea of the scale of this problem. We then set out our policy objectives, and the justifications for them. Next we outline the different options we have considered. We follow this with an assessment of the main costs and benefits associated with each option, before referring to the available evidence.
- C.2 It is important to emphasise that this is a provisional impact assessment based on the evidence currently available to us. We will provide a more comprehensive assessment in our final report, based in part on the responses we receive to the questions set out at the end of this Appendix. These questions are also to be found at the end of Part 6 of our consultation paper.

#### THE PROBLEM

- C.3 The current law on the admissibility of expert evidence in criminal trials has resulted in a number of miscarriages of justice. The risk of juries basing their verdicts on unreliable expert evidence as a result of an insufficient inquiry into evidentiary reliability at the admissibility stage has led some commentators to conclude that there is a “pressing danger” of unfair convictions.<sup>1</sup>
- C.4 There is at present no specific bar to the admissibility of expert evidence of doubtful reliability, save that expert evidence, like any other evidence, must satisfy the “ordinary tests of relevance and reliability”.<sup>2</sup>
- C.5 Perhaps more worrying, there are no guidelines to assist the trial judge in his or her determination of the “relevance and reliability” of expert evidence. Crown Court judges (and their counterparts in magistrates’ courts) are left to determine the question of admissibility as best they can without any uniformity of approach. Attempts at common law to introduce a separate bar to admissibility, or specific guidelines to assist in determining the evidentiary reliability of expert evidence, have been unsuccessful.<sup>3</sup>
- C.6 Given the importance of expert evidence in criminal trials, this lack of uniformity and the concomitant risk of unreliable evidence being admitted raises real concerns. The problem is aggravated by the following factors:

- (1) non-specialist individuals involved in the trial process may find it difficult to determine just how reliable scientific (or purportedly scientific) expert evidence is or, in the case of advocates, to challenge the evidence in cross-examination;<sup>4</sup>

<sup>1</sup> D Ormerod and A Roberts, “Expert Evidence: Where Now? What Next?” (2006) 5 *Archbold News* 5; see para 2.12 above.

<sup>2</sup> See paras 3.1 to 3.3 above.

<sup>3</sup> See paras 3.4 to 3.14 above.

<sup>4</sup> See paras 2.8 and 2.9(2) above.

- (2) cross-examination is not necessarily an effective tool for ensuring that jurors are equipped to determine the reliability of expert evidence,<sup>5</sup> and
  - (3) scientific (or purportedly scientific) expert evidence may have a particularly persuasive effect on jurors in criminal cases.<sup>6</sup>
- C.7 In addition, an otherwise reputable expert may be permitted to stray outside his or her field of expertise and propound, unchallenged, a superficially credible but unreliable hypothesis. Again, this may mean that unreliable expert evidence is ultimately relied on by the jury, possibly resulting in a miscarriage of justice.<sup>7</sup>
- C.8 The concern that juries may be basing their verdicts on unreliable expert evidence would appear to be well founded. In recent years there have been a number of highly-publicised miscarriages of justice involving unreliable expert evidence being considered by juries.<sup>8</sup> Such cases suggest that without reform – that is, without a new approach to the determination of the evidentiary reliability of expert evidence – there will continue to be a risk of wrongful convictions based on unreliable evidence.<sup>9</sup>

#### **The scale of the problem**

- C.9 The impact of wrongful convictions or acquittals is significant, extending far beyond the individuals directly concerned. It affects the shared interest of every citizen in having a fair and just criminal justice system.

<sup>5</sup> See paras 2.8 and 2.9(2) above.

<sup>6</sup> See para 2.10 above.

<sup>7</sup> See paras 2.16 to 2.19 above.

<sup>8</sup> See paras 2.14 to 2.24 above.

<sup>9</sup> See paras 2.25 to 2.27 above.

- C.10 It is very difficult, however, to give an accurate picture of the extent to which the admission of unreliable expert evidence in criminal proceedings has resulted in wrongful convictions or acquittals. While, for a given year, it is possible to say how many criminal cases there are in the Crown Court,<sup>10</sup> how many defendants pleaded not guilty,<sup>11</sup> how many cases resulted in an acquittal,<sup>12</sup> how many appeals were heard by the Court of Appeal (Criminal Division)<sup>13</sup> and how many convictions were quashed by the Court of Appeal,<sup>14</sup> it is not known, and it is difficult to estimate, just how many cases involved the use of expert evidence of doubtful reliability. As far as we are aware, there is no central collection of data on the number of cases in which expert evidence is tendered or admitted; and there would appear to be no data on the number of cases in which expert evidence is wrongly allowed to go before criminal juries. Nor is it possible to ascertain the number of cases in which expert evidence has been wrongly excluded.
- C.11 In short, it is not possible to ascertain the exact number of cases where a miscarriage of justice has occurred on the basis of the admission of unreliable expert evidence. First, it seems that no-one has conducted the necessary research. Secondly, beyond considering successful appeals, there is no way of knowing whether a jury relied on unreliable evidence to reach its verdict. A jury may take several factors into account when determining its verdict, one of which may be expert evidence, and yet the weight attached to such evidence would be difficult if not impossible to evaluate.
- C.12 There can be no doubt, however, that there have been *some* recent miscarriages of justice caused by a jury's reliance on unreliable expert evidence, as exemplified by cases such as *Clark (Sally)*<sup>15</sup> and *Cannings*.<sup>16</sup>

#### **THE POLICY OBJECTIVE**

- C.13 The principal aim of our proposals is to minimise the risk of a miscarriage of justice in cases where a party seeks to rely on expert evidence, whether the evidence is tendered by the prosecution or the defence. We also wish to bring clarity and certainty to the law and legal processes governing the admissibility of expert evidence.

<sup>10</sup> In 2007, 82,721 cases were received for trial at the Crown Court and 82,886 cases were dealt with (a higher figure than the number of cases received because the backlog was reduced): "Judicial and Court Statistics 2007" (2008) Cm 7467, p 107. See: <http://www.justice.gov.uk/docs/judicial-court-stats-2007-full.pdf>.

<sup>11</sup> In 2007, 28,391 defendants pleaded not guilty: "Judicial and Court Statistics 2007" (2008) Cm 7467, p 109.

<sup>12</sup> Of the 28,391 who pleaded not guilty in 2007, 17,184 were acquitted: "Judicial and Court Statistics 2007" (2008) Cm 7467, p 109.

<sup>13</sup> In 2007, there were 523 appeals against conviction. Of these appeals, 196 were allowed and 327 dismissed: "Judicial and Court Statistics 2007" (2008) Cm 7467, p 23.

<sup>14</sup> 196 in 2007: "Judicial and Court Statistics 2007" (2008) Cm 7467, p 14.

<sup>15</sup> [2003] EWCA Crim 1020; see paras 2.16 to 2.19 above.

<sup>16</sup> [2004] EWCA Crim 1, [2004] 1 WLR 2607; see paras 2.20 and 2.21 above.

## **JUSTIFYING THE OBJECTIVE**

- C.14 Avoiding miscarriages of justice, whether wrongful acquittals or wrongful convictions, is, in our view, a policy objective which does not need further justification.
- C.15 There are, however, social and economic costs which follow from miscarriages of justice, and it is worth mentioning them briefly here. These are costs which arise irrespective of the cause of the miscarriage of justice, and which are not peculiar to the problems associated with the admissibility of expert evidence.

### **The cost of appeals**

- C.16 The admission of unreliable evidence at the trial stage may result in costs in the form of legal appeals. Appeals against conviction in the Crown Court are heard by the Court of Appeal (Criminal Division). The Court of Appeal is already overstretched. In the year 2006 to 2007, 3010 applications before that court were outstanding, with an average waiting time of nearly 11 months for appeals against conviction and about four months for appeals on sentencing.<sup>17</sup> The appeal process itself has cost implications for the appellant, whether privately funded or publicly funded, for the court service, and for the prosecution authorities.

### **The cost of wrongful convictions**

- C.17 Where an individual has been wrongfully convicted, compensation may also need to be paid from public funds. Not all individuals who successfully appeal against a conviction are eligible to claim compensation, and not all those who are eligible are entitled to a payment. Around 25 applicants for compensation are found to be eligible each year.<sup>18</sup> Where compensation is payable, it may include an amount to represent lost earnings, and an amount to represent suffering and harm to reputation, with an overall limit of £1 million where a person was detained for at least 10 years, and £500,000 in all other cases.<sup>19</sup>
- C.18 If an individual has been wrongfully convicted, but a crime was committed, then the real offender may still be free to commit more offences, with immeasurable costs in the form of physical and psychological harm caused to the offender's new victims. In addition, whilst it is difficult to identify the extent of the monetary cost of this factor, there are potential cost implications, such as the impact on policing.

<sup>17</sup> The Court of Appeal Criminal Division Review of the Legal Year 2006 / 2007 (2007) p 18 (Annex A); and also para 1.3, p.3.  
See: [www.hmcourts-service.gov.uk/cms/files/CAO\\_Annual\\_Review\\_2006\\_2007.pdf](http://www.hmcourts-service.gov.uk/cms/files/CAO_Annual_Review_2006_2007.pdf).

<sup>18</sup> Regulatory Impact Assessment for the Criminal Justice and Immigration Bill (Ministry of Justice, June 2007). The Government took the view that the changes introduced by the Bill (now the Criminal Justice and Immigration Act 2008) would not affect the number of eligible applicants. See [www.justice.gov.uk/docs/regulatory-impact-assess-1.pdf](http://www.justice.gov.uk/docs/regulatory-impact-assess-1.pdf), para 4.2, p 86.

<sup>19</sup> Section 133A(5) of the Criminal Justice Act 1988, inserted by s 61(7) Criminal Justice and Immigration Act 2008. The maximum that may be paid for lost earnings or earnings capacity is calculated as 1.5 times the median annual gross earnings for each year of the claim: s 133A(6) Criminal Justice Act 1988. According to the Office of National Statistics, the mean income in the UK per year at April 2008 was £24,908, based on an average weekly wage of £479. See: [www.statistics.gov.uk/cci/nugget.asp?id=285](http://www.statistics.gov.uk/cci/nugget.asp?id=285).

- C.19 The costs of implementing the wrongfully convicted individual's sentence are unnecessarily incurred,<sup>20</sup> with an average annual cost per prisoner and cost per place in prison accommodation of £27,343 and £29,561 respectively.<sup>21</sup>
- C.20 The measurable cost of imprisonment may also be assessed in terms of the consequences that wrongful imprisonment may bring to the (wrongfully convicted) individual and to society more generally. When in prison, the individual is no longer productive in society, leading to a reduction in output equal to his or her wage. Upon leaving prison the difficulties of obtaining employment are greatly increased, not least because of the erosion of skills and the individual's absence from the labour market.<sup>22</sup> If the individual is assumed not to find work for a year, this is a cost to society equal to his or her wage rate: a cost borne by the individual in lost income and by the exchequer as lost income tax revenue.<sup>23</sup> There may also be other financial implications, such as increased welfare support costs.
- C.21 The effect of a family member being imprisoned may also have financial implications extending to publicly-funded bodies such as the National Health Service.
- C.22 There are, in addition, immeasurable costs to the prisoner and his or her family, such as the costs associated with emotional distress, loss of reputation, separation from family, and so on. There is also an increased risk of homelessness following the release of a prisoner. Surveys have indicated that 30 per cent of people released from prison will have nowhere to live.<sup>24</sup>

### **Wrongful acquittals**

- C.23 Significant costs also follow from incorrect acquittals, although the scale is even harder to ascertain than for wrongful convictions. The impact on a particular victim, where a defendant is wrongfully acquitted, may be felt in different ways, not all of them measurable. An obvious result might be that the acquitted offender is free to offend again, possibly against the same victim. The opportunity to re-offend exposes the public to increased and unnecessary risk.

<sup>20</sup> Imprisonment is not the only sentencing option available to the court, but it entails the most extensive costs when compared to other sentences.

<sup>21</sup> HMPS Annual Report and Accounts 2007 / 2008 HC 860, Appendix 5, p 91.  
See: [www.hmprisonservice.gov.uk/assets/documents/10003D1EHMPS\\_AR\\_appendices\\_2007-08.pdf](http://www.hmprisonservice.gov.uk/assets/documents/10003D1EHMPS_AR_appendices_2007-08.pdf).

<sup>22</sup> It is important to note that having a criminal record can cause someone to lose his or her job, and/or make it difficult to find another job. A survey by the Chartered Institute of Personnel Development shows that people with a criminal record are part of the "core jobless group" that more than 60 per cent of employers deliberately exclude when recruiting. See CIPD, 2005 *Labour Market Outlook*, [www.cipd.co.uk/pressoffice/articles/31082005092814.htm?IsSrchRes=1](http://www.cipd.co.uk/pressoffice/articles/31082005092814.htm?IsSrchRes=1).

<sup>23</sup> For a person earning the average national wage of £24,908, the lost income to the individual would be this average income less tax (£18,893), with a lost contribution to his or her national insurance totalling £2,241. The lost tax revenue would be £3,744. These figures are based on the mean national income provided by the Office of National Statistics ([www.statistics.gov.uk/cci/nugget.asp?id=285](http://www.statistics.gov.uk/cci/nugget.asp?id=285)) and a 20 per cent income tax rate after the £6,035 personal allowance.

<sup>24</sup> Prison Reform Trust, "Bromley Briefings, Prison Factfile", June 2008, p 36, citing Niven S and Stewart D (2005) "Resettlement Outcomes on Release from Prison" Home Office Findings 248.

- C.24 Rates of recidivism should be considered when discussing the likelihood of a wrongfully acquitted individual re-offending. Since criminals who are imprisoned are likely to re-offend at a rate of 67.4 per cent (a rate which has been increasing since 1992),<sup>25</sup> by extension it can be assumed that some, if not most, of the criminals who are wrongfully acquitted will also re-offend. Costs of re-offending extend to the physical and psychological impact on victims, as well as to increased policing and imprisonment costs.

#### **The effect on public confidence**

- C.25 When a conviction is quashed, there may be considerable media attention: the miscarriage of justice becomes widely known. Importantly, reducing the risk of incorrect acquittals and convictions on the basis of unreliable evidence will reduce the risk of a loss of public confidence in the criminal justice system.

#### **OUTLINE OF OPTIONS AND PROPOSALS**

- C.26 In our consultation paper we have described four options for reform:<sup>26</sup>
- (1) exclusionary discretion without guidance;
  - (2) exclusionary discretion with guidance;
  - (3) consensus amongst experts; and
  - (4) judicial assessment of evidentiary reliability.
- C.27 Of those options for reform, we prefer the fourth. Option 4 encompasses the following specific proposals:
- (1) a new statutory test to govern the admissibility of expert evidence;<sup>27</sup>
  - (2) guidelines to assist the judge when determining the evidentiary reliability of scientific (or purportedly scientific) expert evidence;<sup>28</sup>
  - (3) guidelines to assist the judge when determining the evidentiary reliability of experience-based (non-scientific) expert evidence;<sup>29</sup> and
  - (4) an obligation on the party tendering expert evidence to demonstrate that the evidence is sufficiently reliable to be admitted.<sup>30</sup>

<sup>25</sup> Prison Reform Trust, "Bromley Briefings, Prison Factfile" (2006), p 5, citing Home Office (2004) "Re-offending of Adults: Results from the 2002 Cohort".

<sup>26</sup> See Part 4.

<sup>27</sup> See para 6.10 above.

<sup>28</sup> See para 6.26 above.

<sup>29</sup> See para 6.35 above.

<sup>30</sup> See para 6.57 above.



## **SUMMARY OF POTENTIAL COSTS AND BENEFITS**

- C.28 In brief, our provisional view is that the proposed reforms within Option 4 would bring the significant benefit of fewer miscarriages of justice. There would be cost implications of such reforms, some of which would be the initial cost of implementation and some of which would be continuing costs. There would also be cost implications of not implementing these reforms. We tentatively conclude that the potential cost savings, in avoiding miscarriages of justice, would outweigh the initial and ongoing cost of implementing Option 4.

## **POTENTIAL COST / BENEFIT ANALYSIS**

### **No change**

- C.29 Before considering the potential costs and benefits of the various options for reform, we should first state what the costs and benefits of doing nothing appear to be.
- C.30 By doing nothing it is likely that there will continue to be no universally accepted means, in the form of a clear test with guidelines, by which trial judges are able to assess the evidentiary reliability of expert evidence. Accordingly the risks identified will continue to be present in criminal trials where expert evidence is presented and the risk of wrongful convictions and acquittals will not be reduced. The social and economic costs of miscarriages of justice are described above.
- C.31 The only benefit of not reforming the rules for the admission of expert evidence is the avoidance of the cost of law reform itself, along with the possible additional costs entailed by having some new procedural rules.<sup>31</sup> These costs include those associated with passing draft legislation through Parliament, and the costs of implementing reforms occasioned by primary or secondary legislation.
- C.32 Our provisional view is that this benefit is outweighed by the cost of not reforming the law. As described above, wrongful convictions and wrongful acquittals incur a significant cost to individuals, government and society in general. We tentatively conclude that our proposed reforms would result in long-term savings and that the initial cost of implementation would be recouped within the medium term as the benefits of reform accrue.

<sup>31</sup> See Part 6, para 6.2 and fn 2.

### **Options 1, 2 and 3<sup>32</sup>**

- C.33 Options 1, 2 and 3 consist of various possibilities, none of which would effectively address the problems identified above. These possibilities involve: treating expert evidence like other evidence generally, giving the judge an exclusionary discretion in relation to it; providing guidance alongside an exclusionary discretion; or providing a test which would allow judges simply to defer to experts in the field. Whilst potentially less costly to implement,<sup>33</sup> these possible solutions would still provide no separate test for determining the reliability of expert evidence and the same cost risks attached to wrongful convictions and acquittals would therefore remain.

### **Option 4<sup>34</sup>**

- C.34 Option 4 would see the creation of a new statutory test, enabling the trial judge to assess the reliability of any expert evidence tendered for admission before the jury. The test would be accompanied by detailed guidelines for scientific and non-scientific evidence, and an obligation on the party tendering the evidence to demonstrate its reliability. We also ask whether, exceptionally, the judge should be able to call upon the specialist advice of an assessor to provide him or her with assistance. Although we make no proposals on training or accreditation, we also suggest that practitioners and judges would benefit from training on expert evidence, particularly scientific evidence; and we recognise the benefits of a compulsory accreditation scheme for experts in criminal proceedings.
- C.35 The various facets of Option 4 could be considered separately, but in order to achieve effective reform they are better assessed as a single option comprising a number of specific proposals.

### ***The potential impact of Option 4***

- C.36 A clear test for admissibility would be beneficial, primarily, in leading to more accurate outcomes in criminal trials, meaning fewer wrongful convictions and fewer wrongful acquittals.
- C.37 With fewer miscarriages of justice, the risk of damage to public confidence in the criminal justice system would also be reduced.
- C.38 Our provisional view is that the reform also has economic benefit. We have described the costs potentially incurred by miscarriages of justice above, and those costs would be avoided.

*We would welcome any information our consultees can provide which would allow us to estimate how many fewer wrongful convictions and acquittals there would be annually if Option 4 were to be implemented.*

<sup>32</sup> For Option 1, see paras 4.4 to 4.13 above; for Option 2, see paras 4.14 to 4.26 above; and for Option 3, see paras 4.27 to 4.37 above.

<sup>33</sup> Less costly because, if Option 4 were to be rejected in favour of one of these alternatives, there would be fewer (if any) changes to the present law of evidence and procedure.

<sup>34</sup> See generally paras 4.41 to 4.85 above. The specific proposals we make within the scope of Option 4 are set out in Part 6.

### ***Training***

- C.39 Education and training of practitioners and judges constitute a cost for each person trained. For example, education is necessary to ensure that Crown Court trial judges understand the principles of the scientific method when assessing the evidentiary reliability of a scientific hypothesis. Additional training and education of practitioners and the judiciary was recommended by the House of Commons Science and Technology Committee in their 2005 report.<sup>35</sup> The Committee also recommended that the judiciary should receive an annual update on scientific developments relevant to their work.
- C.40 It is likely that the focus of training will be on those who are employed in the more complex legal cases, such as those judges and practitioners in the Crown Court dealing with rape, murder and other offences against the person. The majority of Crown Court work is undertaken by circuit judges and recorders. As at April 2008<sup>36</sup> in England and Wales there were 653 Circuit Judges and 1,305 Recorders. There were 136 District Judges (Magistrates' Courts), 37 Lords Justices of Appeal, and 73 Queen's Bench Judges who may also have to be trained. There will be an initial cost of training professional judges and criminal practitioners, but this cost will fall with time when only new legal professionals and those requiring a top-up of their existing skills will have to be trained.
- C.41 We believe the cost of training could be limited by incorporating it into pre-existing training programmes.
- C.42 Solicitors and barristers are already required to undertake a certain number of hours training per year in order to maintain their practising certificates. Any cost would be borne by the practitioners (or their employers) who choose to undertake training to assist their work in this regard. A training seminar run by the Law Society typically requires a payment in the region of £100 to £150.<sup>37</sup> We believe it is unlikely that practitioner training will add significantly, in terms of cost and time, to training currently required by the Solicitors Regulation Authority and the Bar Standards Board.

<sup>35</sup> House of Commons Science and Technology Committee Seventh Report, "Forensic Science on Trial" (2004-2005) HC 96-1, p 78.

<sup>36</sup> For the data in this paragraph, see: [www.judiciary.gov.uk/keyfacts/statistics/monthly.htm](http://www.judiciary.gov.uk/keyfacts/statistics/monthly.htm).

<sup>37</sup> This figure differs depending on various factors, such as the length of the seminar or course; see: <http://services.lawsociety.org.uk/events>.

- C.43 Training of the judiciary is primarily undertaken by the Judicial Studies Board. The Board is an independent, judicial body, which forms part of the Directorate of Judicial Offices of England and Wales. The Board is funded and staffed by the Ministry of Justice. The Board's budget for 2007-2008 was £8.05m.<sup>38</sup> Circuit judges receive formal residential training for four days every three years, and one annual training day session per year. Usually there will be input from an expert at those training days.<sup>39</sup> In addition, judges trying sexual offences receive specialised training on expert evidence.<sup>40</sup>
- C.44 We assume that the training required, if our proposals were implemented, could be incorporated into the judicial and lawyer-training regime which currently exists. The alternative is that it could be additional. Where it is additional, the cost should be quite low, and for current practitioners it could be incorporated into their ongoing obligation to follow a programme of professional development.

*We would welcome our consultees' views on the training implications of our proposals.*

### **Accreditation**

- C.45 We refer to accreditation in the consultation paper for the sake of completeness only. We do not address the impact of our proposals on this issue in this impact assessment.

### **Implications of Option 4 for the court process**

#### EXPERT WITNESSES

- C.46 The provision of evidence by an expert to a criminal court is by way of a written report or by appearing in court to give oral evidence and face cross-examination (or both). Under Option 4, some expert witnesses may have to spend more time preparing their reports and testimony to ensure that the reliability criteria which determine admissibility are satisfied. This would result in increased costs for their clients and the courts. We believe, however, that once there is widespread awareness of how the rules will be applied, these additional costs will fall.
- C.47 To estimate the costs incurred by expert witnesses' clients, it is necessary to note that there is a difference between the rates paid by the state and the rates paid privately. It is also necessary to note that where the cost of an expert witness is paid for out of public funds, preparation and written reports are covered by the Legal Services Commission, whereas a court appearance is likely to be paid for out of central funds.<sup>41</sup>

<sup>38</sup> Judicial Studies Board Annual Report 2007-2008, p 44; see: [www.jsboard.co.uk/aboutus/annualreports.htm](http://www.jsboard.co.uk/aboutus/annualreports.htm).

<sup>39</sup> House of Commons Science and Technology Committee Seventh Report, "Forensic Science on Trial" (2004-2005) HC 96-1, p 83.

<sup>40</sup> Above.

<sup>41</sup> Criminal Bills Assessment Manual of the Legal Services Commission, section 4.7 (Version 12: January 2008).

- C.48 There are guideline rates of payment for publicly-funded expert witnesses in the Crown Court.<sup>42</sup> It is recommended that a forensic scientist, for example, should be paid £47 to £100 per hour for preparation and £226 to £490 for a full day's attendance at court. These rates are discretionary, however.
- C.49 The following table shows the average cost of experts' time for court appearances and report writing.<sup>43</sup>

	<u>Writing Reports</u>	<u>Attending court</u>	<u>Average</u>
Legal Aid	£140	£165	£153
Non-Legal Aid	£152	£154	£153
Average	£146	£159	£153

- C.50 The average length of time per case, in hours, spent writing reports was around 30, and attending court, around 20.<sup>44</sup>

#### IMPACT ON THE COURTS

- C.51 If judges are required to perform a gate-keeping role for all expert evidence, we would expect some increase in costs to follow in the short term. This is because a duty to check the reliability of all expert evidence would result in a degree of scrutiny, of some evidence at least, which would not occur now, and this would increase the total court time and associated costs (such as the cost of representation) in relevant cases.
- C.52 The cost of some trials (in terms of court time, judicial time and the time of legal representatives) may increase as a result of experts being called to give evidence in court. This will happen if written reports and submissions do not overcome the reliability barrier, and either the judge or an opposing party requires oral evidence to be given on the matter so that the evidence can be effectively challenged by cross-examination. If attendance by an expert witness is required, there will be the increased cost of paying for that attendance, normally borne by central funds, because court appearances are more expensive per hour than written reports.
- C.53 Thus, an increase in the length of a case would have financial implications for HM Court Service, the Crown Prosecution Service and other prosecuting authorities, individual defendants and the Legal Services Commission.

<sup>42</sup> A "Guide to Allowances in Criminal Cases" issued under Part V of the Costs in Criminal Cases (General) Regulations 1986 is reproduced in the Legal Services Commission's Criminal Bills Assessment Manual (Version 12: January 2008) Appendix 5: "Bands used in the Crown Court: Guideline Rates from 6 May 2003". See also section 4.3 of the Manual.

<sup>43</sup> Bond Solon and Legal Services Commission Expert Witness Survey 2008, p 3. This survey is based on a small sample of experts and so is indicative only of the average cost of experts' time in writing reports and attending court. It does, however, accord with similar surveys. See: "Expert Witnesses Survey (2007)" JS Publications ([www.jspubs.com/Surveys/feesurveys.cfm](http://www.jspubs.com/Surveys/feesurveys.cfm)).

<sup>44</sup> Bond Solon and Legal Services Commission Expert Witness Survey 2008, p 5.

- C.54 However, the cost of some trials may be reduced since unreliable evidence will be properly challenged and rendered inadmissible at an earlier stage in the proceedings. This will prevent time being spent at a later stage challenging the reliability of expert evidence which has been adduced. It may even mean that a case concludes earlier than it would otherwise have done, with commensurate savings.

***Impact of the appointment of an independent assessor***

- C.55 In paragraph 6.67 of the consultation paper we set out a tentative draft provision which would allow Crown Court judges, exceptionally, to call upon an independent assessor to provide assistance when undertaking the gate-keeping role.
- C.56 We accept that if a judge were to appoint a specialist assessor, there would be demands on the time required of the judge and the representatives in the case, as well as on that of the assessor and potentially one or more expert witnesses. In some cases, however, it may be that the judge could deal with the matter by way of written submissions; and if an oral hearing were thought necessary, it would not be in front of a jury. So, we do not envisage that a provision of this sort would greatly add to the cost of Crown Court proceedings. In any event, a judge would be able to seek the advice of a specialist assessor only exceptionally, so any financial impact would be small.

***Other consequences***

- C.57 We suspect that the reforms we propose would affect investigators, including the police.

*We would be interested to know from consultees what they think these effects would be.*

**Risks**

- C.58 The most obvious risk is that we have under-estimated the potential increase in costs related to criminal trials which would result from the implementation of Option 4, and/or that we are mistaken about the benefits.

*We would welcome consultees' comments on the risks.*

**EQUALITY ASSESSMENT OF OPTION 4**

We have considered whether Option 4 would have any specific effects on people dependent on how they are categorised, with reference to the categories of age, race, gender, sexual orientation, religion and disability. Our view is that whilst changes to criminal law policy may in certain cases have an effect on these groups, a change to evidentiary rules will not lead to any adverse impact on members of the above groupings.

## **QUESTIONS FOR CONSULTEES**

- C.59 Do consultees agree with our view that the potential costs of Option 4 are outweighed by the potential benefits, when compared with the cost / benefit analysis of doing nothing and of Options 1, 2 and 3?
- C.60 Do consultees agree with our view that, in the medium to long term, the benefits of implementing Option 4 would outweigh the associated financial costs?
- C.61 Do consultees consider that we have captured all the potential benefits and costs associated with our proposals for reform?
- C.62 In addition, to enable us to assess more accurately the potential impact of our proposed reforms, we would welcome:
- (1) any data which would allow us to estimate how many fewer wrongful convictions and acquittals there would be annually if Option 4 were to be implemented (paragraphs C.36 to C.38 above);
  - (2) views on the training implications of our proposals (paragraphs C.39 to C.44 above);
  - (3) information or views on the potential effect of our proposed reforms on investigators, including the police (paragraph C.57 above); and
  - (4) comments on the risks associated with our impact assessment (paragraph C.58 above).

# APPENDIX D

## COMMON SOURCES OF UNRELIABILITY IN SCIENTIFIC EVIDENCE

**David Hand**

**Professor of Statistics, Imperial College, London**  
**President, Royal Statistical Society**

- D.1 The essence of science is that it is based on empirical evidence. That is, on data which describe the objects or phenomena being studied. Data come in various shapes and forms, but most often in science they are numerical – perhaps measurements or counts. Various analyses, very often statistical, are used to summarise these data, and match them to the theories and potential explanations formulated by researchers. A good match lends credence to a theory. A poor match can suggest that the theory is lacking in some way, but it might also suggest that the data are inaccurate.
- D.2 That brief outline allows us to identify certain ways in which scientific research might be poor, and perhaps even help us identify work which is fraudulent.
- D.3 It is obviously central to the process that the predictions derived from the theories must be sufficiently precise that the comparison with data provides a rigorous test. If the theories predict a wide range of possible outcomes, then the test does not help us eliminate inadequate theories. Classic examples of imprecision are magazine astrological predictions. These are typically so general that it is possible to fit many different actual outcomes to the ‘prediction’. A prediction about which one can almost always retrospectively say ‘it was right’, whatever the outcome, is useless.
- D.4 In a related vein, when numerical predictions are given, they should always be accompanied by ranges of values indicating how accurate they are thought to be. A report that a certain diet will lead to an average weight loss of five pounds per week is less exciting when one discovers that there is also a good chance that it might lead to a weight gain. Hiding such information is bad science: all measurements have associated measurement error, and integrity requires that this is reported in some way. An illustration of the possible consequences was given by the case, widely reported in the media some years ago, of an accusation of child sexual abuse, where a medical doctor had failed to properly appreciate the fact that no diagnostic test is perfect, and that some false positives (measurement error) should be expected to occur.
- D.5 Raw data are also often imperfect in the sense that they have missing values: perhaps a patient did not attend every session, perhaps an instrument failed or suffered a glitch. Missing data problems are particularly prevalent in studies relating to human beings and biological systems. If data appear to be perfect, one might justifiably ask about missing values, and how they were dealt with.



- D.6 A central issue in scientific integrity is how to select the data to be analysed. A magazine survey asking the single question 'do you reply to magazine surveys' is hardly likely to give an accurate impression of the proportion of its readers who reply to such surveys. More generally, however, it is often the case that not all the observations should be included in an analysis (for example, perhaps some chemical reactions became contaminated, perhaps some patients failed to follow the treatment regime, and so on). In such cases it is necessary that objective criteria are given for deciding which observations to include. Subjective decisions risk introducing bias - which may be conscious or subconscious. This is a general principle in any pre-processing or cleaning of data prior to analysis: subjective procedures risk distortions and misleading conclusions. In evaluating scientific evidence, one needs to be alert for subjectivity creeping in.
- D.7 Dangers of bias can be reduced in various ways - and if such a method has not been adopted one needs to ask why. For example, to examine the effect of a potential treatment, intervention, or policy, one needs to be able to compare a treated group with a 'control' group. The two groups should differ only by virtue of the fact that one has received the treatment and the other not. Random assignment to the two groups implies statistical equivalence between the subjects assigned to each group. 'Blinded' experiments, in which, for example, a doctor does not know whether a treatment or control is being applied to each patient (for example, because the medicines, labelled A or B, have been prepared to look the same), prevents the doctor from subconsciously treating the groups differently. Only after the data have been analysed is it revealed which of the A or B medications was the control.
- D.8 One must be wary of studies which have trawled data extensively. Given a large data set, if one looks hard enough, one is almost certain to find unusual patterns in it. The so-called 'bible code' is an illustration of this, in which large corpora of letters are almost certain to contain accidental concurrences which appear to give a hidden message, purely by chance.
- D.9 Data which conform very closely to a scientific prediction should also arouse suspicion - but detecting this requires both considerable statistical expertise and an understanding of the particular scientific field and the nature of the data it generates.
- D.10 Percentages and proportions are often a convenient way to summarise changes. We might note, for example, an increase of 50 per cent (meaning that the final value is 1.5 times the original value). However, such values can be misleading if the baseline values are not always reported. A 100 per cent increase in the accident rate in a population would mean just one extra accident if the baseline value was 1. Results which take only a few values should arouse suspicion (for example, if the reported percentages take only the values 0 per cent, 33 per cent, 67 per cent, and 100 per cent one might suspect that they could be based on only three observations). In general, suspicion should be aroused by any report which gives percentages or proportions without also indicating the denominators.

- D.11 When making comparisons, it is obvious that like should be compared with like. If different raters, definitions, or instruments are used to evaluate things, then one should check to see if some sort of standardisation has been adopted. It is also necessary to see that the right comparison is being made: does one want school league tables to show the level of final results, or the value added by the school, with an appropriate adjustment for the entry characteristics?
- D.12 These are just a few common ways in which scientific evidence may be misreported. There are, of course, many others. The key thing is to adopt a critical attitude when evaluating reports.