Harmonisation in Forensic Expertise

An inquiry into the desirability of and opportunities for international standards

Edited by

J.F. Nijboer and W.J.J.M. Sprangers
3 Confronting Expert Evidence under the European Convention

Petra van Kampen

1 Introduction

One of the problems of expert evidence is that such evidence has a tendency to become 'blackboxed'. Once the expert's research has been done, and the results have been made known, it is difficult to determine to what extent the researcher in question (if known at all) was experienced enough, the method sufficiently adequate and appropriate to the investigation at hand, and the results valid for proving guilt. Expert evidence, in other words, is difficult to refute 'after the fact', particularly for criminal defendants, who often have neither the resources nor the personnel to carry forward this task. It is expensive, complex, and generally quite time-consuming. As such, it has all the characteristics that may give rise to an imbalance of resources between the parties in criminal proceedings. At the same time, expert evidence is currently one of the more important types of evidence around in criminal cases, regularly determining the fate of these same defendants. This is not to say that modern criminal justice systems do not encompass rules designed to mitigate this imbalance of resources between prosecutors and criminal defendants. Most systems of criminal justice, if not all, have rules dictating the disclosure of certain documents, although this system of disclosure often is neither 'full proof' nor particularly helpful in outlining what the aforementioned documents should entail. In addition, most criminal justice systems have rules allocating financial resources to criminal defendants for using particular (expert) services, albeit such resources are usually rather limited, and therefore potentially

1 Similarly, see P. Traest, Het Bewijs in Strafaaken [Evidence in Criminal Cases], Gent: Mys & Breesch 1992, 134.
3 In the Dutch criminal justice system, for example, Articles 30–34 Code of Criminal Procedure outline which documents should be disclosed to the defendant, on what conditions such documents may temporarily be withheld from the defendant, and at what point in time they should be disclosed. However, these rules do not refer to expert evidence in particular, nor do they outline what these documents should include. As a consequence, although such reports may eventually be disclosed to the defendant, the information presented within these reports may leave much to be desired from a vantage point of becoming knowledgeable on questions such as who performed the analysis (as opposed to who wrote the report), the qualifications of the expert, the method used, as well as how the method was used.
inadequate for the said purpose. Against that background, a key question is whether the national rules of criminal procedure and evidence suffice to guarantee defendants a 'fair trial' as far as expert evidence is concerned, as required by (among others) Article 6 of the European Convention on Human Rights. That is the question this chapter will consider. What rights feature under the Convention with regard to expert evidence? What restraints are imposed? And how does that affect the position of the parties in criminal proceedings, particularly the defendant?

In Section 2, the concept of fairness is analysed, both from the perspective of the European Court's case law as well as from a more theoretical point of view. Section 3 provides a brief sketch of the case law of the European Court as far as expert evidence in criminal proceedings is concerned. Section 4 debates the implications of the rules derived from that case law for systems of criminal justice in the signatory States to the European Convention on Human Rights. In Section 5, these implications are illustrated with reference to one of the criminal justice systems involved — the Dutch criminal justice system. Section 6 concludes this chapter by summarising its findings.

2 The concept of fairness

According to Article 6 of the European Convention on Human Rights, "in the determination (...) of any criminal charge against him, everyone is entitled to a fair and public hearing (...)". In Article 6 § 3 of the Convention, reference is made to certain minimum rights guaranteed to anyone charged with a criminal offense. These include the right to have adequate time and facilities for the preparation of his defence, the right to defend oneself in person or through legal assistance, and the right to examine or have examined the witnesses against him and to obtain the attendance and examinations of witnesses on his behalf under the same conditions as the witnesses against him. As the European Court has often stated however, the concept of a fair trial should not be taken to encompass only those rights mentioned in § 3. Rather, these rights merely form part of the much broader right to a fair trial. It therefore seems logical to ask what the concept of fairness entails. That question, however, is not easily answered. As

---

4 See e.g. Brandstetter v. Austria, ECHR 28 August 1991, Series A, 211, § 66 (holding that the principle of equality of arms is only one feature of the wider concept of a fair trial, which also includes the fundamental right to adversarial proceedings); F.C.B. v. Italy, ECHR 28 August 1991, Series A, 2088 § 29, NJ 1994, 27 (holding that the requirements of § 3 of Article 6 are to be seen as particular aspects of the right to a fair trial guaranteed by § 1); Lala v. The Netherlands, ECHR 22 September 1994, Series A, 297O, § 26, p. 733, NJ 1994, (same); Van Mechelen v. The Netherlands, ECHR 23 April 1997, p. 635, NJ 1996, (same); Saunders v. United Kingdom, ECHR 17 December 1996, § 68, p. 699, NJ 1997, (holding that the right to silence and the right not to incriminate oneself, although not specifically mentioned in Article 6, lie at the heart of the notion of fair proceedings under that article).
Den Hartog has pointed out, the term 'fair hearing' is rather vague, while it is somewhat difficult to ascertain from the Court's case law which goals this right aims to attain. According to Den Hartog, in explaining Article 6 and the rights enumerated in that article, the Court has sought to connect it with 'the rule of law' referred to in the Preamble of the European Convention. In Golder, the European Court stated that "[O]ne reason why the signatory Governments decided to 'take the first steps for the collective enforcement of certain of the Rights stated in the Universal Declaration' was their profound belief in the rule of law. It seems both natural and in conformity with the principle of good faith (Article 31 § 1 of the Vienna Convention) to bear in mind this widely proclaimed consideration when interpreting the terms of Article 6 § 1 according to their context and in the light of the object and purpose of the Convention".

The concept of 'the rule of law' is closely linked to liberal democratic ideals about the relationship between the state and its citizens. In essence, it involves the protection of individual freedom against arbitrary actions by government, as well as the right of citizens to call the state to account for employing intrusive measures. Yet, as Den Hartog has argued, this begs the question against what kind of arbitrary action the citizen is to be protected by the right to a fair trial afforded in Article 6. From analysing the case law of the European Court and the various aspects of the right to a fair trial afforded therein, Den Hartog infers that this right is meant to protect the defendant against arbitrary conviction, whilst that conviction cannot be pronounced before the defendant has been able to exercise his defence rights. According to Den Hartog, these defence rights need to be seen as a guarantee against arbitrary conviction; the possibility of exercising those rights is meant to further the soundness of the investigation and thereby of the determination of guilt and sentencing. And thus, non-compliance of the rights enumerated in Article 6 § 3 does not automatically lead to the conclusion that the right to a fair trial has been infringed upon. According to a decision of the European Commission from 1982,

5 Den Hartog, A., Artikel 6 EVRM: Grenzen aan het streven de straf eerder op de daad te doen volgen [Article 6 ECHR: Limitations on the attempt to speed up punishment of the crime], Antwerpen/Apeldoorn: Maklu Uitgevers 1992, p. 48.
6 Golder v. United Kingdom, ECHR 21 February 1975, Series A., 18, § 34.
8 Den Hartog, op. cit. p. 42.
10 Den Hartog, op. cit. p. 81.
11 Den Hartog, op. cit. p. 81. See e.g. Saunders v. United Kingdom, ECHR 17 December 1996, § 68, NJ 1997, p. 699 (holding that the rationale of the right to silence and the right not to incriminate oneself lies in contributing to the avoidance of miscarriages of justice).
12 See e.g. Van Mechelen v. The Netherlands, ECHR 23 April 1997, § 53-54, NJ 1997, p. 635 (holding that the use of statements made by anonymous witnesses is not under all cir-
whether this is the case depends on whether the exercise of these rights was “likely to assist in, and (...) thus necessary for, ascertaining the truth (...)”. In other words, “the procedural guarantees of the Convention are not an aim in themselves; they cannot be dissociated from the result of the proceedings”. By the same token, however, “a proceeding might not fulfill the general requirement that it be ‘fair’, even though the minimum rights guaranteed by Art. 6-3 may have been respected”. In other words, the concept of fairness incorporated within the European Convention is largely contextual: its meaning and consequences depend on the procedure as a whole, and not so much on the particular right of the defence at stake. In the view of the European Court, what is right and what is wrong in criminal proceedings cannot be judged in abstracto, but only within the context of the criminal proceedings at hand. Different circumstances, after all, may dictate different actions. And that, according to Soulier, is exactly what the expression ‘fair trial’ refers to: “to be just is to treat equally, thus rendering each his due”. The essence of justice, Soulier asserts, “is thus found in the interrelationship of (...) two terms: equality-speech”.

The reference to the interrelationship between equality and speech in the context of fairness is not devoid of significance, given that the expressly held belief by some that criminal processes do not simply concern the discovery and proving of facts, but are in fact exercises in communication. Their aim, as Maher puts it, is “the communication and justification of the ultimate verdict to the accused”. Consequently, the criminal process should “contain features which give effect to its essentially communicative

---

16 See e.g. Edwards v. United Kingdom, ECHR 16 December 1992, § 34 ((re-)stating “that the Court’s task is to ascertain whether the proceedings in their entirety, including the way the evidence was taken, were fair”); Imbrioscio v. Switzerland, ECHR 24 November 1993, Series A, 274, § 38 (same); Van Mechelen v. The Netherlands, ECHR 23 April 1997, § 50, NJ 1997, p. 635 (same). See also M.A. Heldeweg, Confidence in the Workings of Justice, NTB 1994 (4), p. 82.
18 Solier, op. cit. p. 160.
At their core, the ethics of discourse require freedom of access to the dialogue for those concerned. In addition, it requires that parties have an equal right to participate in the dialogue. This does not mean that all parties have exactly the same rights. As Brants and Field argue, "equality of arms as a slogan for procedural rights is of little use." Rather, it means that the parties are provided with such rights as equalise their respective positions, in order to ensure that each party is in a position to argue against the allegations raised by the opposing parties. In criminal proceedings, this generally means that procedural rights (such as the rights mentioned in Article 6 § 3 of the Convention) need to be allocated to the defendant. These rights ensure that defendants are, in principle, able to communicate their arguments with regard to the relevancy, reliability, and sufficiency of the evidence to the Court on essentially the same footing as their opponent. Whether they suffice for doing so, however, depends on the circumstances of the case. In some instances, more may be required to give each his due.

Inherent in the concept of dialogue, however, also is the imposition of constraints on the participants in order to avoid distortion in communication. What these constraints entail for actual – rather than hypothetical – deliberative processes, however, is not quite clear. To the extent that writers such as Ackerman have debated the issue, the debate about constraints seems to focus on the kind of arguments that can be used by the participants in the dialogue. Equally important for avoiding distortion in communicative processes, however, seems to be limitations on the kind of resources the participants may employ in discourse. If the ethics of discourse require equal and symmetrical access to the discourse, then surely these ethics may also place limitations on the resources used by participants, if the use of these resources amounts to inequality between the participants and thereby to distortion of the communicative process. So construed, constraints are 'negative rights'; limiting the abilities of the parties in order to ensure symmetry and equality.

Within the ethics of discourse, "fairness cannot be defined outside of dialogue between affected parties." The European Court’s concept of fairness seems to correspond to that thought, by focussing on whether the procedure as a whole was fair, viewed from the particular circumstances of the case, and the respective positions of the parties involved. To return to

22 See Brants, C. and S. Field, op. cit. p. 16.
23 Brants, C. and S. Field, op. cit. p. 16.
Soulier, one could argue that “it is the method of resolving the conflict, more than the laws itself, which seems fundamental – the judge more than the law, and criminal procedure more than criminal law”.26

3 Expert evidence under the European Convention on Human Rights

One of the important implications of the European Court's concept of fairness is that the rules featuring within the criminal process are judged independently of the 'justice model' (accusatorial/adversarial or inquisitorial) according to which they were conceived. Having said that, it also needs to be noted that the Court "does require that persons charged with criminal offences be given an adequate opportunity, although not per se at trial, to challenge the evidence brought against them. Per definition, this then seems to require some sort of 'adversarial' procedure".27 In Brandstetter, the Court explained that the right to an adversarial trial (which is part of the wider concept of the right to a fair trial) means "that both prosecution and defence must be given the opportunity to have knowledge of and comment on the observations filed and the evidence adduced by the other party".28 Central to Brandstetter, as well as the preceding case of Bönisch,29 was a dispute about the impartiality of the main (court-)expert involved. The above-mentioned statement, however, was not made in reference to that issue. Instead, it concerned the fact that the Vienna Court of Appeal dealing with the case against Brandstetter had relied on submissions by the Senior Public Prosecutor which had not been communicated to the accused.30 Eventually this resulted in the finding that Article 6 had been violated in (one of) the proceedings against Brandstetter. As far as the role of the expert himself was concerned, however, no such violation was deemed to have taken place. In the preceding case, Bönisch, the Court did find a violation of the right to a fair trial, as guaranteed by Article 6 § 1, particularly because there was little or no equality of arms between the parties where experts were concerned. In light of the link in the Court's case law between the circumstances of the case and the finding that the proceedings as a whole have not been fair, both cases will be analysed more fully below.

3.1 Bönisch v. Austria31

The first of the two cases in which the European Court debated the role of experts in relation to the right to a fair trial was Bönisch. In 1975, Bönisch bought a firm specialised in meat smoking. After complaints by the Federal Food Control Institute (FFCI) that his meat products contained an

26 Soulier, G., op. cit. p. 160.
27 Brants, C. and S. Field, op. cit. p. 27.
30 Brandstetter, § 64.
excessive quantity of benzopyrene (a carcinogenic substance) as well as an excessive quantity of water, Bönisch was prosecuted and convicted of violation of sections 56 (2) and 63 (1) of the Food Act 1975 on several occasions. In October 1977, the Market Office in Vienna again took two samples of smoked meat from the production of Bönisch’s company. The subsequent analysis of the FFCI revealed that the samples once again contained an excessive amount of benzopyrene (and water). A complaint was then lodged with the prosecuting agencies, which led to the prosecution of Bönisch for violation of section 56 (2) of the Food Act 1975. During the subsequent trial the director of the FFCI was appointed as an expert. Bönisch challenged both the judge and the expert, but to no avail. At the request of Bönisch, the Regional Court of Vienna did hear Mr. Prändl, director of the Institute for Meat Hygiene and Technology of the Veterinary University of Vienna, albeit as a witness rather than an expert. Prändl testified that the concentration of benzopyrene found in two counter-samples did not in fact exceed the level permitted under the relevant legal provisions. His testimony was criticised by the director of the FFCI, who argued among other things that the margin of error of the method used by Prändl had to be considerable as the results obtained from each of the two counter-samples differed greatly. On June 29, 1978, Bönisch was convicted of violating the Food Act, and sentenced to 2 months’ imprisonment. In its judgment, the Court stated that it shared the view of the director that the results arrived at by the Institute for Meat Hygiene were erroneous. Bönisch appealed. In December 1978, the Vienna Court of Appeal rejected the appeal.

In 1979, samples were again taken from smoked meat produced by Bönisch. After the FFCI found an excessive concentration of benzopyrene and water, Bönisch was once again prosecuted. In the proceedings that followed, the director of the FFCI was again appointed as an expert and Bönisch was once again unsuccessful in challenging the expert. According to the Vienna Regional Court, the 1975 Act in fact required that an expert from the FFCI be appointed. The mere fact that the director had given unfavorable evidence against Bönisch in other cases did not substantiate the challenge in the eyes of the Court. A request for the hearing of witnesses on the subject was also rejected by the Regional Court, which considered itself sufficiently informed after having examined the director as an expert. On September 20, 1979, Bönisch was again found guilty for violating the Food Act. This time, he was sentenced to one month of imprisonment. The Vienna Court of Appeal dismissed his appeal in May 1980. In its decision, the Vienna Court of Appeal emphasised that Section 48 of the Food Act did require that the FFCI official who had analysed the samples or who had drawn up the report should be appointed as expert.

32 Both prison sentences imposed upon Bönisch were later communted to fines of 30,000 and 15,000 Schillings respectively. Bönisch, § 19.
After the first proceedings, Bönisch lodged a complaint with the European Commission of Human Rights. After the Commission declared the application inadmissible, he lodged a second complaint, in which he reiterated some of the grievances made in the first. Among other things, he argued that the proceedings against him had neither been fair, or complied with the requirement of equal treatment incorporated in Article 6 § 3 (d). The second application was declared admissible by the Commission in July 1982. In its final report the Commission expressed the (unanimous) opinion that Article 6 § 3(d) had been violated in both proceedings and that the first proceedings had also violated Article 6 § 1. Although Article 6 § 3 (d) literally refers to witnesses only, the Commission in its report – and consistent with its own case law – argued that this provision also relates to experts. That being the case, the provision dictates that the defendant has the right to obtain the attendance and examinations of experts on his behalf under the same conditions as the experts against him. In the case of Bönisch, the Commission found both rights (attendance under the same conditions and examination under the same conditions) had been violated. As for compliance with Article 6 § 1, the Commission noted that at the time the director of the FFCI wrote his report for the first set of proceedings against Bönisch, he could in fact expect a bonus should Bönisch be convicted. The mere fact that the expert’s attitude may have been compromised as a result of that expectation was sufficient basis for the Commission to decide (unanimously) that Article 6 § 1 had been violated.

The European Court subsequently also arrived at the decision that Article 6 § 1 has been violated (in both sets of proceedings), yet for different reasons. While the Commission examines the complaint under Article 6 § 3 (d), the Court starts by saying that “read literally, subparagraph (d) of paragraph 3 relates to witnesses and not to experts”. Instead, the Court examines the complaints under § 1. Although the Court goes on to say that it is not for the Court to depart from the definition of the notion of ‘expert’ provided by the Austrian Government, it also emphasises that it cannot rely solely on the terminology employed, but must have regard for the procedural position the expert occupied and the manner in which he performed his function. In doing so, the Court notes that appearances suggested that the director was more like a witness against the accused than an impartial expert. And although “his being examined at the hearings was not precluded by the Convention, (...) the principle of equality of arms

33 The Austrian Government’s argument that court-experts are not in fact to be considered as ‘experts against’ but as a neutral ancillary organ of the court was rejected by the Commission. It stated that ‘the Austrian legal system (...) does not recognise a formal distinction between experts along these lines.’ Bönisch, § 90 (Opinion of the Commission).

34 Prior to the Food Act of 1975, Austrian law provided for such remuneration of the FFCI’s experts should the accused be convicted. That system was abolished in 1975, but still practically applied in 1976, when the director of the FFCI wrote his report in the first set of proceedings. Bönisch, § 122 (Opinion of the Commission).
Confronting Expert Evidence under the European Convention — Petra van Kampen

inherent in the concept of a fair trial (...) required equal treatment as between the hearing of the Director and the hearing of persons who were or could be called, in whatever capacity, by the defence". In the instant case that requirement had not been met. The director had been appointed as an expert, by virtue of which his statements must have carried greater weight than those of ‘expert witnesses’ called by the accused, and yet his neutrality and impartiality were open to doubt. In addition, the director was able to play a dominant role: “he could attend throughout the hearings, put questions to the accused and to witnesses with leave of the Court and comment on their evidence at the appropriate moment (...)”.

Meanwhile, there was little opportunity for the defence to obtain the appointment of a counter-expert, as the rules of procedure required the Court to first hear a member of the FFCI in case clarification was needed, while the Austrian courts could only have recourse to other experts when certain contingencies (not present in the instant case) were met. In light of these circumstances, the Court held Article 6 § 1 to have been violated.

Of particular interest in Bönsch are the differences in opinion between the Government, the Commission, and the Court as regards the status of the expert. The Austrian Government contended that within the Austrian system of law (as in many other Continental systems) the expert is a neutral and impartial expert. In this way, the Government no doubt hoped to escape the implications of Article 6 § 3. As is clear from the preceding analysis, the Commission did not quite agree with that view. The Court does take the neutrality and impartiality of the (court-)expert as a starting point, but that does not help the Austrian Government much. In fact, a good argument can be made for the contention that the fact that the expert needs to be seen as neutral and impartial (like judges) imposes more demanding burdens upon the courts in ensuring a fair trial. In the case of Hauschildt v. Denmark, decided four years after Bönsch, much of what the Court stated with respect to experts in Bönsch was applied to judges, who, by virtue of Article 6 § 1 are required to be impartial. In Hauschildt, the European Court employed a two-pronged test to establish whether or not the judges had been impartial. The second prong requires that “it must be determined whether, quite apart from the judge’s personal conduct, there are ascertainable facts which may raise doubt as to his impartiality. In this respect, even appearances may be of importance”. In Bönsch, such ascertainable facts that raised doubts about the impartiality existed: not with respect to the Court, but with respect to the expert as a neutral ancillary to the Court. The difference between Hauschildt and Bönsch lies in the consequences of finding (appearances of) partiality. Objectively justified fears

35 Bönsch, § 32 (emphasis added).
36 Bönsch, § 33.
regarding the judge's impartiality generally result in a violation of the right to a fair trial. Objectively justified fears regarding the expert's impartiality, by contrast, do not necessarily result in a violation of the right to a fair trial. Instead, such (appearance of) partiality necessitates the conclusion that the expert was more like a witness against the accused. That being the case, the defendant under the Convention has the right (under Article 6 § 3 (d)) to obtain the attendance and examination of experts on his behalf under the same conditions as the experts (witnesses) against him. This may mean that the national court will need to appoint counter-experts, if that is the only way equal treatment can be offered in light of the procedural position of the expert whose impartiality is open to doubt as well as the manner in which he performed his function.

The link between the requirements set for experts and judges within systems like the Austrian criminal justice system can be illustrated further by the second case in which the European Court examined the expert's role, again directed against the state of Austria. That case — Brandstetter — also indicates how a slightly different set of facts may give rise to a very different conclusion as to the requirement of fairness.

3.2 Brandstetter v. Austria

In May 1983, the firm of Brandstetter (an Austrian wine merchant) was visited by a Federal Inspector of Cellars, who took samples from two tanks of white wine. The tanks were sealed and officially seized. Two counter-samples were left with Brandstetter. Examination of the two samples by the Agricultural Institute indicated that the level of natural extracts and mineral substances of the samples was below those required by the Wine Ordinance. In addition, tests taken by an official wine quality control panel indicated that the wine had been diluted with water. Proceedings were then instituted against Brandstetter under Section 45 of the Wine Act. In preparing his defense, Brandstetter had the counter-samples analysed by Niessner of the Federal Food Control and Research Institute, who reported that the level of natural extracts and mineral substances was not below the required minimum. Tasting by a quality control panel, however, Niessner reported, confirmed that water had been added to one of the samples. When first appearing before the Court, Brandstetter requested the District Court to take (additional) expert evidence on the matter. The Court then instructed Bandion of the Agricultural Institute to carry out an expert examination. Bandion, who had not been involved in the initial analysis performed by the Agricultural Institute, subsequently reported that a grave error had been committed in one of the analyses, and recommended that the reserve samples available should be analysed for clarification of the matter. That analysis confirmed the results of the initial examination as far as the level of natural extracts and mineral substance was

concerned. After Bandion’s report was received by the Court and the defence, Brandstetter’s lawyers criticized Bandion’s opinion because of his links with the Agricultural Institute. The defence requested further investigation. The Court, however, did not agree as no doubt existed as to the reliability of the Agricultural Institute’s conclusions or as to Bandion’s objectivity. On 14 February 1984, Brandstetter was convicted of adulterating wine and fined to 5,600 Schillings. Brandstetter then appealed, but was unsuccessful in doing so. In upholding the District Court’s decision, the Korneuburg Regional Court noted that Brandstetter only raised objections to the expert after he had seen his report.

Shortly afterwards, in May 1984, Brandstetter moved to ensure that the evidence was preserved by requesting that additional samples be taken from the sealed tanks, in order to be able to bring action against the state of Austria for unacceptable procedural errors. The District Court thereupon appointed Flack, also a member of the Agricultural Institute, to serve as an expert and to supervise the drawing of new samples. In his report, Flack, who had not been involved in the proceedings against Brandstetter, stated that he had found differences between the results of the analysis done by the Agricultural Institute in the first set of proceedings and his own analysis. In his opinion, these differences were due to the addition of substances. After Flack informed the Court, the latter on its own motion instituted criminal proceedings against Brandstetter for tampering with evidence. The Court appointed Flack as expert. In a second report, submitted one month later, Flack confirmed his earlier findings. The prosecutor then charged Brandstetter with tampering with evidence. In the trial that followed, Brandstetter requested that Niessner be called as a witness in order to testify to the fact that the seals of the counter-samples had not been tampered with. In addition, the defence requested that Niessner be appointed as a second expert. The Court consented to the first request, but denied the second. Niessner was heard, and confirmed that, as far as he had been able to discover at the time, the seals had been intact. In his view, however, the possibility of interference could not be ruled out. Brandstetter was found guilty as charged and sentenced to three months’ imprisonment. His appeal against the decision was dismissed by the Vienna Court of Appeal in September 1986.

Meanwhile, Brandstetter had become involved in a third set of proceedings, this time for defamation, having (in the view of the prosecutor) wrongly accused the Federal Inspector of Cellars of irregularities in taking the first samples, thereby exposing the latter to disciplinary sanctions. In October 1984, Brandstetter was convicted by the Korneuburg Regional Court as charged, and sentenced to a suspended sentence of three months’ imprisonment. His appeal to the Vienna Court of Appeal was dismissed. On an application by Brandstetter, the Attorney General then lodged a plea for a declaration of nullity in the interest of law because of the com-
position of the Court of Appeal. After the Supreme Court allowed the appeal, the case was remitted to the Vienna Court of Appeal, which in April 1987 confirmed its initial judgment in its entirety. It was only afterwards that Brandstetter discovered that the judgments of the Vienna Court almost word for word reproduced observations of the Vienna Senior Public Prosecutor, with which he was unacquainted at the time.

Brandstetter then lodged three applications with the European Commission of Human Rights, that declared all of them admissible. In its report, the Commission unanimously expressed the opinion that Article 6 § 1 had been violated in the first and second set of proceedings, for want of equal treatment between the prosecution and the defence. In addition, the Commission expressed the opinion that the proceedings against Brandstetter for defamation had violated Article 6 § 3 (c). The European Court agreed with neither one of these opinions. As regards the first set of proceedings (on the charge of adulterating wine), the Court agreed that "admittedly, the fact that Mr. Bandion was a member of the staff of the Agricultural Institute which had set in motion the prosecution may have given rise to apprehension on the part of Mr. Brandstetter"." With explicit reference to Hauschildt, the Court then noted that "such apprehensions may have a certain importance, but are not decisive. What is decisive is whether the doubts raised by appearances can be held to be objectively justified". And that, the Court held, could not be said in the first set of proceedings. The mere fact that the expert is employed by the same institute or laboratory as the expert on whose opinion the indictment is based, does not in itself justify fears that he will be unable to act with proper neutrality: "to hold otherwise would in many cases place unacceptable limits on the possibility for courts to obtain expert advice". And since the file did not disclose any other grounds for considering him a witness for the prosecution, the Court held that the principle of equality of arms had not been breached. No breach of the (broader) right to a fair trial had occurred either, since "the right to a fair trial does not require that a national court should appoint, at the request of the defence, further experts when the opinion of the Court appointed expert supports the prosecution case".

With respect to the second set of proceedings (the tampering with evidence charge), the European Court conceded that Brandstetter's apprehensions with regard to the neutrality and objectively of Flack (whose report led to the prosecution of Brandstetter) were in fact justified. Yet, as the Court made clear in Böntisch, that did not mean that it was contrary to the Convention to examine Flack at the hearing. It did mean, however, that the persons who were or could be called, in whatever capacity, by the

39 Brandstetter, § 44.
40 Brandstetter, § 44.
41 Brandstetter, § 44.
42 Brandstetter, § 46.
defence, had to be examined under the same conditions as Flack. Different from the Director of the FFCI in Bönisch, Flack did not play a dominant role during the proceedings. At that hearing, the defence did not dispute Flack’s findings, but stressed the similarities between his analysis and the analysis of Niessner. Upon request of the defence, the latter was then called as a witness. Although this implies that Niessner was not heard under the same conditions as Flack, the Court held that the refusal to appoint Niessner did not breach the principle of equality of arms. The line of argument followed by the defence was that (1) it could be proved that the seals of the bottles were untouched when Niessner started his analysis; (2) accordingly, the counter-samples could not have been tampered with; and (3) it followed that Niessner had analysed the same wine as the Agricultural Institute (and therefore the Institute must have been wrong). In that line of argumentation, the results of Niessner’s analysis were only relevant if it could be proved that the seals were untouched and therefore the counter-samples had not been tampered with. Since the Court found that this could not be established, the ground for appointing Niessner as a second expert in the view of the European Court ceased to exist.

As regards the defamation proceedings, the Court noted that “the principle of equality of arms is only one feature of the wider concept of a fair trial, which also includes the fundamental right that criminal proceedings should be adversarial”.43 Examining the complaint of Brandstetter that the Vienna Court of Appeal had relied on submissions of the Senior Public Prosecutor that were not known to him, the Court held that this indeed constituted a breach of the Convention, albeit of Article 6 § 1 rather than § 3 (c), as the Commission had done.

After Brandstetter, the European Court did not touch on the issue of experts in criminal proceedings again. It did, however, decide two other cases that seem to bear relevance to the use of expert evidence in such proceedings.

One year after Brandstetter, the Court decided Edwards.44 The Edwards case concerned the question whether the failure to disclose potentially exculpatory evidence amounts to a breach of the right to a fair trial. This question is very relevant to the topic of expert evidence, given that in many Continental systems of law such evidence is often reported to the prosecutor and/or court in the form of reports, which are then incorporated in the case-file. In Edwards, the English police had failed to disclose the fact that one of the victims, who had stated that she thought she could identify the defendant, failed to identify him. In addition, the police had failed to identify the existence of fingerprints, which had been found at the scene of

43 Brandstetter, § 66.
44 Edwards v. United Kingdom, ECHR 16 December 1992, Series A, 247-B.
the crime. Edwards contended that the disclosure of this information would have enabled him to attack the credibility and veracity of police testimony (that he had confessed to the offences). In its decision, the European Court unequivocally and broadly held that “it is a requirement of fairness under paragraph 1 of Article 6 (...) that the prosecution authorities disclose to the defence all material evidence for or against the accused (...).” The Court also decided that the failure to do so in the instant case gave rise to a defect in the trial proceedings. Yet, in light of the subsequent events in the Edwards case, the Court ultimately decided that a breach of Article 6 had not taken place, since the defects of the original trial had in fact been remedied in subsequent proceedings.

The second case decided by the European Court on the issue of expert evidence is equally important for our subject, even though the proceedings at issue there concerned the administrative courts rather than the criminal courts. In Mantovaneli v. France, the European Court considered the issue of whether the right to adversarial proceedings also requires that the party be given the opportunity to comment on the expert’s report at a time at which such comments may still have an effect.

After the death of their daughter Jocelyne, the applicants in this case initiated administrative proceedings against the hospital in which she died, being convinced that Jocelyne’s death resulted from an excessive dosage of halothane (a medicine administered to her at all of the ten operations performed on her). On 26 April 1983, the complainants by interim order requested the Court to appoint an expert in order for him to read all relevant documents, question witnesses, and determine the circumstances and cause of Jocelyne’s death. Two days later, their request was denied by the president of the Court, on the grounds that the activities of the experts would be prejudicial to the subsequent trial on the merits. Some time later, in March 1985, the administrative court by interlocutory judgment decided to order “that an expert report which complies with the adversarial principle be carried out”, as the parties disagreed to the fact and the Court found no evidence in the file to enable it to rule on the merits. The expert’s instructions were to (a) inspect the medical file of Jocelyne; (b) describe the medical treatment she received; (c) indicate the chances for recovery; (d) state whether halothane was used and in what circumstances; whether that use was in accordance with accepted practice, and whether

45 Edwards, § 36.
46 Edwards, § 39. After it was discovered that the information had not been disclosed, the Secretary of State referred the case to the Court of Appeal. The latter examined the transcript of the trial, and considered the impact of the non-disclosed information on Edwards’ conviction. Although the police officers who had given evidence at the trial had not been heard by the Court of Appeal, the European Court stated that it was nonetheless open to the defence to make an application to the appeal court that the officers be called as witnesses. Edwards, pp. 37–38.
the complications that arose were related to the use of halothane, and if so, whether such complications were common; as well as (e) interview all relevant witnesses.\textsuperscript{48} Four months later, the expert files his report with the Court and the parties. In that report, the expert concluded among other things, that the hospital was not responsible for Jocelyne's death. In response, the complainants contended that they were not accurately informed about the expert's investigation, nor had they seen all documents the expert referred to in his report, in breach of the principle of adversarial proceedings. In November 1985, the Court held that while the plaintiffs were justified in submitting that there were irregularities in the production of the expert's report, they did not dispute the facts that appeared from their own evidence and the expert report. Thus, the Court dismissed the action.

Mr. and Mrs. Mantovanelli appealed this decision, arguing that they had been unlawfully deprived of the opportunity to make their own submissions as to the cause of death of their daughter. The administrative Court of appeal dismissed the appeal, however. In the opinion of the appellate Court, the fact that the expert's report did not comply with the adversarial principle did not prevent the judges from relying on the facts in the report which they considered were not disputed or not seriously challengeable. In addition, the appellate Court noted that the applicants could have challenged the report, but refrained from doing so.

In February 1993, shortly after the Mantovanellis had been notified that they would not receive legal aid for filing an appeal on points of law with the Conseil d'Etat, the applicants filed a complaint with the European Commission, arguing that — as the expert's report was not prepared in accordance with the adversarial principle — they had not received a fair trial. In its report, the Commission expressed the opinion that there had indeed been a violation of Article 6 § 1. The European Court agreed with that opinion. After having reiterated that one of the elements of a fair hearing within the meaning of Article 6 § 1 is the right to adversarial proceedings, the Court first cautions that "compliance with the adversarial principle related to proceedings in a 'tribunal': no general abstract principle may therefore be inferred from this provision that, where an expert has been appointed by a court, the parties must in all instances be able to attend the interviews held by him or to be shown the documents he has taken into account".\textsuperscript{49} What is essential, the Court held, "is that the parties should be able to participate properly in the proceedings before the 'tribunal'".\textsuperscript{50} And that essential requirement, the Court found, had not been complied with in the instant case. For although the Mantovanellis could have made sub-

\textsuperscript{48} Mantovanelli, § 17.
\textsuperscript{49} Mantovanelli, § 33.
\textsuperscript{50} Mantovanelli, § 33.
missions to the Court on the content and findings of the report after having received it, the Court was not convinced that this “afforded them a real opportunity to comment effectively on it”. The Court noted that the question the expert was instructed to answer was identical with the one the Court had to determine, and pertained to a technical field that was not within the Court’s knowledge. Thus, the expert’s report “was likely to have a preponderant influence on the assessment of the facts by that court”. In these circumstances, the applicants “could only have expressed their views effectively before the expert report was lodged”. And since there had been no practical difficulty allowing them to do so, the proceedings had not been in accordance with Article 6 § 1.

4 Implications of the European Court’s case law as regards expert evidence

As has been mentioned before, the European Court’s findings as relates to the fairness of proceedings involving expert evidence are strongly tied to the circumstances of the particular case. Against that background, it seems a little hazardous to try to distil general and abstract principles from certain rulings, and apply them to criminal justice systems other than the one these rulings are related to. Yet, on the other hand, the Court’s case law on this issue does give us insight into the principles that guide the European Court’s case law, and thereby its determination of fairness as far as expert evidence is concerned.

4.1 The right to adversarial proceedings
The first of the guiding principles, and one that is paramount in the Court’s case law, is that proceedings need to be adversarial: both parties must be given the opportunity to have knowledge of and comment on the observations filed and the evidence adduced by the other party. Not only does this principle require that the defendant be informed about (the contents of the) comments filed by the prosecution (as was the case in Brandstetter), it also requires the prosecutorial authorities to disclose all material evidence (including expert evidence) to the defendant, whether for or against the accused. Note, however, that this requirement does not mean that all evidence needs to be disclosed. The European Court employs the word ‘material’ evidence. In Dutch legal literature, this term is generally considered to refer to (legally) relevant evidence, that is evidence of relevance to the probanda of the case (that which has implications for proving and convicting of the charge).
This guiding principle requires that experts' reports, whether inculpatory or exculpatory, be disclosed to the defendant. It also requires that the report itself contain positive and negative results of particular testing procedures. This is far from stating the obvious. A recent study of scent line-ups conducted by Dutch police officers indicates that reports drawn up by these officers were added to the case-file in about 62% of the cases that could be retrieved by the researchers. In most of the cases in which the report could not be found in the case-file, the dog had not identified the defendant. Of course, when such reports are not filed with the prosecutor, the latter will be unable to disclose them to the defence. In addition, some Dutch cases appear to indicate that, much like the situation in Edwards, police officers tend to forego reporting that a particular witness has not identified the defendant during a line-up, presumably on the basis that negative results are unimportant. As is clear from Edwards, this assumption is dangerous, and it may well amount to a breach of the right to a fair trial.

As the European Court made clear in Mantovanelli, the right to adversarial proceedings is a trial right: it concerns the right to be able to comment on the evidence and comments filed by the opposing party before the tribunal itself. The right to comment during the preparatory stages of the report thus is not included. Yet, and on the other hand, the right to adversarial proceedings does mean that the parties be provided a real opportunity to comment effectively on the report during the proceedings. And when comments can only still have an effect when they are made prior to the trial, the right to adversarial proceedings does seem to indicate that the defendant should be provided such an opportunity. As Mantovanelli indicates, such a situation may arise when (a) the question the experts is instructed to answer is identical to the question before the Court; (b) that question pertains to a technical field that is not within the Court's knowledge; while (c) there is no practical difficulty in allowing the defendant to express his views before the report is filed with the Court and the parties. Whether and to what extent such a situation is likely to arise in criminal

vant evidence differs from the meaning attributed in Anglo-American systems of law. In the American criminal justice system, for example, the concept of 'material evidence' is taken to refer to evidence 'having a probability to undermine confidence in the outcome of trial.' See United States v. Bagley, 473 U.S. 667, 683 (1985). Relevant evidence, by contrast, is "evidence having a tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence." (American) Federal Rules of Evidence 401 (1975). The definition of 'material evidence' used by the European Court seems to correspond more closely to the definition of 'relevant evidence' in the American (federal) system of law than it does to the concept of 'material evidence' in that system of law.

54 Van der Westen-Baptist, E.I.M.T., Effectiviteit van de sorteerproef [Effectiveness of scent line-ups], Leiden: Faculty of Law, Universiteit Leiden 1998, p. 15.
55 See e.g. HR 13 December 1994, DD 95.140.
proceedings is somewhat difficult to ascertain. In general, it seems that administrative and civil proceedings are particularly different from criminal proceedings as regards condition (a). Usually experts in criminal proceedings are sought to assist in seeking answers to questions that are related to, but not exactly like, the ultimate question to be decided by the Court. To give one example: fingerprint experts assist the prosecution and/or court in determining whether the fingerprints found at the scene of the crime match those of the defendant. Whether the defendant is guilty as charged is a different issue, although the answer to the first question of course bears relevance to the second.

4.2 The right to confront the expert and his evidence on an equal footing
As has been stated above, the right to adversarial proceedings is the paramount objective underlying the European Court’s case law: it is the least that should be done in ‘the determination of a criminal charge’ (Article 6 § 1). At times, however, that requirement may imperiled, however, due to the manner in which the expert goes about performing his duties. In principle, the Convention requires there be equality of arms between prosecution and defence where knowledge of all material evidence and the ability to confront such evidence are concerned. The defence needs to be provided the opportunity to be able to comment on the expert and his evidence without being at an a priori disadvantage vis-à-vis the prosecution. In Anglo systems of law, such equality is generally guaranteed by providing both parties with essentially similar rights to call and (cross-)examine experts. Some Continental systems of law, however, go about this equality in a different manner. In these systems of law, the expert functions as a neutral and impartial ancillary to the Court, meaning that he investigates the case without giving any thought to the effects of his evidence for one party or the other. As appears from the European Court’s case law, the neutral and impartial expert is not per se at odds with the requirements of the Convention, provided that the expert does in fact act impartially. As soon as appearances suggest that the expert is not acting with the presumed impartiality and neutrality, and when these appearances are objectively justified by the circumstances, the requirement of fairness demands a tour de force on part of national courts to remedy the defect. A defect, because an expert who does not act impartially and neutrally in fact violates the terms of his employment by the Court. Such an expert is actually acting as an expert/witness for the prosecution (or defence; but that situation has not arisen under the Convention yet). As the European Court held in Bönisch and Brandstetter, the Convention does not really preclude the expert against whom objectively justified fears exist from being heard by the Court, provided the persons called by the defence are given essentially the same treatment. This does not necessarily mean that the persons called by the defence need to be called as experts: they may also be heard as witnesses, depending on the circumstances of the case. Whether calling witnesses or experts on behalf of the defence suffices to ensure that the trial as
a whole is fair greatly depends on the way in which the Court goes about evaluating their evidence. As long as the Court keeps an open mind, and shows it is keeping an open mind, little is wrong with calling persons on behalf of the defence in a different capacity than those appearing on behalf of the prosecution. The problem, however, is that statements of experts appointed by the Court often carry greater weight for the Court’s assessment than those of other persons testifying before the Court on behalf of the parties, be it witnesses or experts, by virtue of the fact that they are presumed to act impartially and neutrally. As such, the defence faces a disadvantage that can only be remedied by one action on behalf of the Court: the appointment by the Court of another expert. Only in such a situation does the defence’s position to comment on the evidence equal the position of the prosecution, for only then do the statements of both experts carry equal weight. At that point, the right to adversarial proceedings can again be played out in full: both parties are once more in a position to effectively comment on the evidence adduced by the other party.

4.3 A synthesis
Read in this way, the European Court’s case law seems to establish a two-pronged test designed to ensure that criminal proceedings involving expert evidence are fairly conducted. The first requirement is that national courts in any event ensure that both parties are able to have knowledge of, and (at the trial) comment on, the evidence adduced by the opposing party. If objectively justified fears exist that the expert appointed by the Court is not in fact acting with the presumed impartiality and neutrality, a second prong needs to be made. In these circumstances, national courts need to ensure that the defendant is provided the opportunity to secure the attendance and examination of experts and/or witnesses on their behalf under the same conditions as the experts against them. This may dictate that the Courts appoint counter-experts, for that may be the only way in which the statements of the experts for the prosecution and those for the defence carry the same weight.

5 Expert evidence and the requirement of fairness in dutch criminal proceedings

At the time the European Convention was signed, most of the Member States assumed that their legal systems would not conflict with the Convention’s requirements for fairness. The Dutch were no exception to that belief: “In an atmosphere of self-assurance, together with the (...) moderate, tolerant, and mild social and penal climate within the country, the legislature had the strong impression that we were among the ten countries which most respected human rights”.

however, indicates that the Dutch system of law leaves much to be desired in the area of criminal law. Both in the well-known case of Kostovski v. The Netherlands, and in Van Mechelen v. The Netherlands, the European Court reproached the Dutch Courts for their reliance on statements of anonymous witnesses, thereby violating the requirement that the defendant be provided the opportunity to examine the witnesses against him. While Dutch legislature and Courts for more than a decade after its ratification by The Netherlands paid little attention to the European Court’s case law, today that same case law serves as a forceful impetus for reform of Dutch criminal procedure, and there is little doubt that some of the landmark cases decided by the Dutch Supreme Court in the area of criminal law in general, and expert evidence in particular, would not have come about had it not been for the European Court’s decisions in cases like Bönisch, Brandstetter, and Edwards.

Four years after Edwards was decided by the European Court, the Dutch Supreme Court faced the question whether the withholding of certain information (in this case: the photos shown to the witnesses in order to enable them to identify the perpetrator) violated the defendant’s right to a fair trial as required by Article 6 of the Convention. The governing tenet of the current Dutch Code of Criminal Procedure (1926; hereafter: CCP) is full disclosure of all ‘documents of the case record’ upon the defendant’s request, at least from the moment charges have been filed against the defendant. Prior to this time, ‘documents of the case record’ formally need to be disclosed to the defendant unless the prosecutor or the investigating judge deem it necessary that these documents be (temporarily) withheld from him in the interest of the investigation. Central to the meaning of the rules of discovery is the term ‘documents of the case record’. Somewhat curious in that respect is the fact that the Dutch Code of Criminal Procedure does not define that term, other than indicating what documents should in any event be considered to be part of these documents. In


59 ECHR 23 April *NY* 1997, p. 635.
60 Article 33 CCP reads “the disclosure of the complete documents of the case may not be withheld from the defendant (...) as soon as the defendant has been informed of the decision to prosecute him, or charges have been filed against him.”
61 Article 30 (2) CCP. Certain documents, however, may not be withheld from the defendant. These include: (a) the official records of the interrogations the defendant was subjected to; (b) the official records of examinations or investigative activities the defendant or his counsel were allowed to be present at; and (c) the official record of examinations the contents of which the defendant has orally been informed of. See Article 31 CCP.
1996, in a case known as the *Dev Sol* decision, the Dutch Supreme Court put an end to the debate in Dutch legal literature regarding the meaning of the words 'documents of the case record'. In language very similar to the language used by the European Court in *Edwards*, the Dutch Supreme Court held that "the record of the case should include documents that may reasonably be of interest, either in the inculpating or exculpating sense of the word. (...) Access to documents of the case record may not be withheld from the defendant and his counsel, saving (...) temporary restrictions". In the same decision, however, the Supreme Court more or less muddied the waters by stating that there are also documents that do not belong to the documents of the case record (thus not representing 'documents of the case record') but that are nevertheless potentially relevant in light of assessing the reliability and trustworthiness of the evidence adduced by the prosecutor. In *Dev Sol*, the Supreme Court held that the defendant *in principle* should be given access to these documents not belonging to the case record. In principle, because the investigative interests at stake may warrant withholding these documents from the defendant.

The 'reasonably of interest' criterion used by the Supreme Court in *Dev Sol* and earlier decisions bears similarity with the European Court's reference to 'material evidence'. In effect, the criterion implies that the prosecution may have knowledge of more documents than are — and need to be — disclosed to the defence. Although defence counsel in the past have frequently argued that this inequality amounts to a breach of the principle of equality of arms incorporated in the European Convention, these arguments have been unsuccessful. In the opinion of both the Dutch Supreme Court and the European Commission, the mere fact that the prosecutor has knowledge of more documents than those incorporated in the case record does not in itself violate the principle of equality of arms. What does violate that principle, and more generally the right to a fair trial, is the withholding of evidence for or against the defendant that the prosecutor unjustly considered not to be of (reasonable) interest. The principle of adversarial proceedings, in other words, does not require equality in knowing all that has been discovered.

---

63 In the case at issue the defendant had been denied access to particular documents because of the investigative interests at stake. Such access was, however, provided to defence counsel. The latter refused to make use of that opportunity, on the ground that her client was refused access. After the Supreme Court decided the case, defence counsel filed a complaint on that issue to the European Commission. The Commission subsequently held that it was not contrary to the Convention to deny the defendant (but not his counsel) access to certain documents, given that the photograph albums were required by the prosecution authorities for use in ongoing investigations. And as the photograph albums could not be regarded a decisive element for the defendant's conviction, the complaint was declared inadmissible. *Ayyildiz v. The Netherlands*, European Commission of Human Rights, 9 September 1998 (Application No. 35138/97).
during the investigation, but only equality in knowing what reasonably bears relevance to deciding the case. That, however, is a fine line to walk on. And without access to all documents bearing to the investigation, the defence will be hard-pressed to succeed in arguing that the line has been crossed. 65

As regards expert evidence, however, there was one issue that troubled the defence far more than the ability to discover it. That issue concerned whether the defendant has a right to so-called 'counter-expertise' (contra-expertise): the right to have evidence re-examined by a different expert. Under the rules of criminal procedure set forth by the Dutch Code of Criminal Procedure experts were to be appointed by the investigating judge during the preliminary judicial inquiry.66 As such, the expert functioned as an ancillary to the Court, investigating the case without having regard to the interests of one party or the other. Once the expert had been appointed by the investigating judge, the defendant and his counsel had certain rights, including the right (a) to be present during the expert's investigation (conditional upon a finding that the investigation is not hindered by the defendant's presence);67 (b) to comment on the expert's investigation (even when it is conducted outside their presence);68 (c) to designate an expert to be present for them;69 and (d) to have the expert's report reviewed by another expert.70 Each of these experts – including those designated by the defendant – are considered court-experts; they report to the investigating judge and are paid by the State to serve the interests of justice.71 According to the Code of Criminal Procedure, prosecutors were formally able to appoint such experts only when (a) they had requested the investigating judge to open a preliminary judicial inquiry; (b) there was no time to wait for the actions of the investigating judge; and (c) there was a pressing need to act.72 If any of these conditions had not been

66 Article 227 CCP: "The investigating judge may, ex officio, or upon request of either the prosecutor or the defendant, appoint one or more experts to assist or inform him, and, when necessary, instruct the expert to investigate the matter and provide him with a substantiated report." As of May 1999, however, the rules on the appointment of experts have been amended. These rules took effect on 1 February 2000. For more detail on (some of) these changes, see note 72.
67 Article 231 (1) CCP.
68 Article 231 (3) CCP.
69 Article 232 CCP.
70 Article 233 CCP.
71 Article 234 CCP.
72 Article 151 CCP. "When the activities of the prosecutor cannot be waited for either, assistant prosecutors have a right to appoint the expert; Article 158 CCP. As of May 1999, however, article 151 have been amended, now allowing for the appointment of experts by (assistant-) prosecutors without involvement of the investigating judge. According to the amendment, which will take effect on 1 February 2000, the prosecutor may, ex officio, or on request of the defendant or his counsel, appoint one or more permanent forensic experts to assist or inform him, and when necessary, instruct the expert
met, prosecutors and assistant prosecutors had no statutory power to appoint experts (save exceptions in specific laws). If the conditions had been met, defendants were entitled to exercise all rights they would be able to exercise had the investigating judge appointed the expert. As such, these rights allowed the defendant to comment on the expert’s investigation before his report was submitted to the (investigating) judge, and therefore at a time at which his comments may still have an effect (a possibility potentially important in light of Mantovanelli).

Formally, this still is the procedure that needs to be followed for appointing experts in criminal proceedings. In practice, however, it is seldom used, particularly with respect to forensic science experts. Between 1951 and 1988, the involvement of the investigating judge in appointing experts from the Forensic Science State Laboratory dropped from 80% to a mere 3%. Instead, experts receive most of their assignments from prosecutors and police officers. This change of ‘venue’ has been caused by three developments. The first of these developments is the centralisation of forensic science investigations with the Forensic Science State Laboratory (established in 1945). Over the years, many of the experts with this laboratory have been sworn in as permanent forensic experts. Such experts only take the oath once (upon their appointment). Although they formally need to be appointed in each case anew, the fact that they are under oath has caused the Supreme Court to basically forego that requirement, presumably because the oath sufficiently ensures their impartiality and neutrality.

As forensic science techniques became more sophisticated, and the workload of the Forensic Science State laboratory increased, a process of ‘controlled decentralisation’ emerged, transferring thereby many of the techniques used to (specialised) police officers, lessening the need to appoint experts from ‘outside’. The third and probably most important development that caused the decline of judicial involvement, however, was the Dutch Supreme Court’s case law on the requirements for the appointment of experts. Faced with the argument of defence counsel that prosecutors and police officers were not entitled to independently engage experts in criminal proceedings, the Dutch Supreme Court in 1978 decided that “the requirement that experts’ report be used in evidence only when the experts have been sworn in as permanent forensic experts. Such experts only take the oath once (upon their appointment). Although they formally need to be appointed in each case anew, the fact that they are under oath has caused the Supreme Court to basically forego that requirement, presumably because the oath sufficiently ensures their impartiality and neutrality.

As forensic science techniques became more sophisticated, and the workload of the Forensic Science State laboratory increased, a process of ‘controlled decentralisation’ emerged, transferring thereby many of the techniques used to (specialised) police officers, lessening the need to appoint experts from ‘outside’. The third and probably most important development that caused the decline of judicial involvement, however, was the Dutch Supreme Court’s case law on the requirements for the appointment of experts. Faced with the argument of defence counsel that prosecutors and police officers were not entitled to independently engage experts in criminal proceedings, the Dutch Supreme Court in 1978 decided that “the requirement that experts’ report be used in evidence only when the experts have been appointed by either the investigating judge or the prosecutor and have been sworn in as such, does not have a basis in law”.

---

73 Groeneveld, E.R., Is de onathankelijke deskundige in het strafproces uitgediend? [Has the independent expert in criminal proceedings had its day?] AA 1989, p. 925.

74 See Article 228.2 CCP.

75 HR 8 November 1960, NJ 1961, 49.

These three developments (but particularly the latter) greatly facilitated the use of experts in Dutch criminal proceedings. As the activities of the investigating judge were no longer required, the process became much less time-consuming. Yet, the absence of the investigating judge had a detrimental effect upon the position of the defence. The defendant’s right to be present during the expert’s investigation, to be able to comment on it, and to designate an expert to either be present for him or review the expert’s report are not triggered unless the investigating judge is involved. In that situation, the question whether or not the defendant needs to be given the opportunity to re-examine the evidence becomes crucially important.77

Initially, the Dutch Supreme Court refused to acknowledge the existence of such a right. In the Court’s view, the argument “that contested reports can only be used in evidence when the defence has been able to re-examine the evidence has – in general – no foundation in law”.78 Writers debating the issue, however, argued that the case law of the European Court (Bönisch and Brandstetter) does in fact require that the defendant be given the opportunity to re-examine evidence should he so request. Early in 1993, and almost eight years after Bönisch, the Supreme Court acknowledged that right, albeit not unconditionally. In what is known as the ‘peanuts case’ (pindanootjes arrest) the Court held that “the requirement of a fair trial may necessitate the granting of the defendant’s request to re-analyze samples, when the request is made at a time at which such testing is still possible”.79 More recently, the Supreme Court rephrased that holding slightly, this time holding that the appellate court in the case at hand was correct in deciding that “in principle, the defendant cannot be denied his right to re-examine evidence”.80 For that right to apply, defendants need to make an explicit and motivated request for re-examination at a time when such an examination is still possible.81

Interestingly, although the Dutch Supreme Court’s decision in the ‘peanuts case’ no doubt was heavily influenced by Bönisch, its decision differs from the holding in that case in various respects. One of the ways in which it differs is the absence of reference by the Dutch Supreme Court to

77 Some laws specifically require that the defendant be provided that opportunity. See e.g. Articles 10a and 21 (1) Wegenverkeerstrwet (Road Traffic Act); Article 26 (3) Warenwet (Consumers Good and Health Act); and Articles 151a (3) /1953 (1) CCP (as regards DNA evidence).
80 HR 13 May 1997, Ny 1997, 152.
81 See e.g. HR 14 June 1994, Nyb No. 197; HR 7 May 1996, Ny 1996, 573. Some lower courts have since held that the defendant needs to be informed of his right to re-examine evidence. After all, without information that such a right exist, defendants will be unable to invoke it. See e.g. Arr.Rb. Rotterdam, 27 June 1997, (10–200849–97) (unpublished). That latter decision was struck down in appeal, however; see Hof ‘s-Gravenhage 21 November 1997, Ny 1998, 140. See also HR 5 January 1999, Ny 1999, 229 (conclusion Advocate General Fokkens).
the notion of 'objectively justified fears regarding the expert's neutrality'. Central to Bönisch was the fact that the expert who had in fact prompted the filing of criminal charges against the defendant was subsequently appointed by the Austrian court as an expert. The objectively justified fears regarding the expert's partiality resulted primarily from that combination. In the 'peanuts case', that combination was absent, or so it seems from the case record. As such, the Dutch Supreme Court's ruling in the 'peanuts case' is much more widely applicable than its predecessor at the European Court, and arguably justifiably so. As some writers have argued, "expert's results can be erroneous even if the expert is neutral. Therefore, it is necessary to examine not only the expert who appears not to be neutral, but also experts who do appear to be neutral".82

In Bönisch and Brandstetter, the European Court held that the existence of objectively justified fears does not preclude the expert from testifying at the hearing, yet does require that the defendant be provided the opportunity to secure the attendance and examination of his experts/witnesses under the same conditions. In the 'peanuts case', the Dutch Supreme Court translated that requirement into the defendant's right to have another expert re-examine the evidence, without actually (visibly) considering other options, presumably in the belief that without a right to re-examine evidence, there will be no compliance with the requirement that both experts need to be examined 'under the same conditions'. Yet, according to the European Court's case law, that requirement only attaches to the ability to secure the attendance and examination of the experts at trial and not to the abilities of the expert him- or herself in investigating the case.

There is, however, a catch in the Dutch Supreme Court's case law as it relates to the right to re-examine evidence. In May 1997, the Court held that the appellate court in the case at hand was correct in deciding that although, in principle, the defendant cannot be denied his right to retest evidence, it is not a foregone conclusion that the State must pay the expenses related to exercising that right.83 Whether that is indeed the case depends on the question – to be decided after the case has come to a close and thus after re-examination has been carried out – whether such reimbursement can take place under Article 591 (1) CCP. This article allows defendants to ask the courts for reimbursement of expenses made in the interests of the investigation.84 Should the Court decide that the expenses

84 Article 591 (1) CCP reads: "the state will provide the former defendant or his heirs with reimbursement of the costs with which the defendant has been charged in accordance with the Statute on Fees in Criminal Cases [Wet Tarieven Strafzaken], to the extent that
related to re-examination have not served the interests of the Court’s investigation, the defendant will end up having to finance these costs himself. As a result of that decision, the defendant’s right to re-examine evidence may carry very little practical force. Whether that comports with the requirements of the European Convention, however, is at least questionable. The European Court has repeatedly stated that the rights of the Convention must be practical and effective. A right that in principle allows the defendant to re-examine expert evidence, without the practical ability to exercise that right, is neither.

The inability to be able to re-examine (expert) evidence due to a lack of financial resources may have repercussions for the procedure to be followed during the expert’s investigations. From point of view of Mantovanelli, one could argue that the inability of the defendant to effectively comment on the expert’s evidence after it has been lodged with the trier of fact, requires that the defendant be provided with the opportunity to comment on the expert’s investigation before his report is submitted. As has been argued in Section 3, however, whether that argument indeed holds true is difficult to assess from the outside, if only because the conditions present in the case of Mantovanelli may not (often) be present in criminal proceedings. Interestingly enough, the rules of the Dutch Code of Criminal Procedure regarding the appointment of experts by the investigating judge and the related rights of the defendant (such as the right to comment on the expert’s investigation while it is taking place) achieve exactly that. From that perspective, there is something to be gained from following this procedure.

Recently, however, the procedure set forth by the Dutch Code of Criminal Procedure for the appointment of experts has been quite profoundly amended. As of 1 February 2000, prosecutors have the power to autonomously appoint (permanent forensic) experts, without involving the investigating judge. The defendant does not have the right to designate an expert to be present during the investigation conducted by the expert appointed by the prosecutor, nor does he have the right to designate an expert who will share the costs of the investigation (...). Such reimbursement may be provided independent of the outcome of the proceedings. A request for reimbursement must be made within three months after the case has come to a close; Article 591 (2) CCP. On the basis of Article 16 Statute on Fees in Criminal Cases, the defendant may ask for advance payment of such costs. Advance payment is provided when the registrar is of the opinion that these costs will serve the interests of the investigation. For more detail, see Van Kampen, P.T.C., op. cit. pp. 76-77.


86 See supra, note 72. For criticism of Article 151 CCP (new), see e.g. Hielkema, op. cit. p. 43; Van Kampen, op. cit. pp. 127-131.
pert to review the expert's report. Instead, as of that date a defendant will have the right to request the investigating judge for investigative action regarding his case (including the appointment of experts) as soon he has reason to believe that criminal charges will be filed against him (the so-called 'mini-instruction'). This latter amendment was highly influenced by the European Court's case law: in the view of the Commission that prepared these legislative changes (the Commission Moons), as well as the Legislative Advisory Body (Raad van State), such a defence right would increase the fairness of Dutch criminal proceedings. In order to qualify for that right, a defendant – according to the Commission – must show (a) which investigative action he wants the investigating judge to take; (b) why the latter should take such action; and (c) which experts should investigate the matter. Should the defendant fail to satisfy one of these requirements, the investigating judge may refuse the request. If the request is granted, the defendant has the right to be present during the expert's investigation (conditional upon a finding that the investigation is not hindered by the defendant's presence), as well as the right to comment on the expert's investigation. He does not, however, have the right to designate an expert for him, or to have the expert's report reviewed by another expert.

As such, these two amendments no doubt promote the European Court's requirement that criminal proceedings be adversarial in nature. That is to say: in theory. What their effect will be in practice, remains to be seen. As some writers have pointed out, one reason to be skeptical about the impact of the amendments is that the prosecutor's ability to appoint experts is currently (according to the Dutch Supreme Court's case law) virtually unrestricted. Under the new rules, that ability will become more restrictive; the prosecutor's right only applies to experts who have already been sworn in as permanent forensic experts by an appellate court. Whether national courts, and particularly the Dutch Supreme Court, will require the prosecutors to follow these more restrictive rules, and how investigating judges will deal with defence requests to appoint experts, are questions that will no doubt be answered in due time.

87 Article 36a-36f CCP (new).
91 Commissie Herijking Wetboek van Strafvoering, op. cit. 70.
92 Article 36e (1) j° 231 CCP.
93 Article 36e (1) CCP.
94 Hielkema, J., op. cit. p. 43.
6 Concluding remarks

The developments that have taken place within the Dutch criminal justice system as regards expert evidence bear witness to the importance of the European Convention and the institutions established to, among others things, protect the defendant’s right to a fair trial. As the European Court’s case law indicates, it requires quite some effort to be fair. How much effort is required from one case to the next, however, is difficult to assess from the outside. All we have are a few principles to guide us in that direction. The first of these guiding principles is the principle that criminal proceedings be adversarial: both parties must be given the opportunity to have knowledge of and comment on the observations filed and the evidence adduced by the other party. The second principle is that the parties be provided with the opportunity to confront expert evidence on an equal footing. These two principles are at the heart of the matter. It is the responsibility of national courts and legislatures to make them a matter of fact.

References

Commissie Herijking Wetboek van Strafvordering, *Herziening van het gerechtelijk vooronderzoek* [Reform of the Preliminary Judicial Inquiry], Arnhem: Gouda Quint 1990.


van der Westen-Baptist, E.L.M.T., Effectiviteit van de sorteerproef [Effectiveness of scent line-ups], Leiden: Faculty of Law, Universiteit Leiden 1998.

A European View on Forensic Expertise and Counter-Expertise

A proposal on building a European Network: the “Community of Active Forensic Experts (CAFE)”

Livia E.M.P. Jakobs and Wim J.J.M. Sprangers

1 Introduction

In the year 1991 the city of Leiden (the Netherlands) was confronted with a strange and unique case. After a woman was found dead in her residence, the pathologist who performed the autopsy discovered that a ballpoint pen had penetrated her brain through one of her eyes. The conclusion in the autopsy report was that Mrs. M. had died as a result of this ballpoint-penetration and that any causes of death, other than brain damage, could be excluded. In 1995 this case was tried before the District Court¹ of The Hague. The court found proven that the son of the victim had murdered his mother intentionally and with premeditation. According to the court, he had shot a ballpoint through her eye, into her head, with a small crossbow. In the first instance the governmental forensic laboratories were asked only for the autopsy and not for any further investigations.

After the conviction by the district court, the defence started a search for expertise that could help to prove the impossibility of the woman’s supposed cause of death. Finally the defence found a university expert willing to investigate the case. Confronted with the results of this latter investigation, the Court of Appeal of The Hague decided to ask the forensic science institute to investigate the case as well. In fact the governmental experts practised counter-expertise here. In 1996 the Court of Appeal² of the Hague decided, after studying many expert reports of different disciplines, that it could not be established beyond a reasonable doubt exactly what had happened, and the accused was acquitted. The most important pieces

² Court of Appeal, The Hague, April 4, 1996.
of evidence were the various expert reports, such as the autopsy report, the report of a psychologist concerning the behaviour of the dead woman’s son and a report by a scientist in biology, who did tests to reconstruct the accident/attack with the ballpoint using a crossbow, targeting prepared human skulls. This case, known as ‘the ballpoint case’, illustrates the complexity and unpredictability of the need for forensic expertise by the public prosecutor as well as by the defence lawyer.

This case clearly demonstrates the different types of expertise that may be involved in criminal cases. Generally the experts asked by the police and justice to perform forensic science investigations, work for governmental forensic institutes. In these institutes a broad range of expertise is available. While the institutes are financed by the government, police and justice are not charged for the investigations they request. The consequence of this situation is that - with a rare exception - experts of the forensic institutes (in the Netherlands) perform investigations only at the request of police and justice authorities.

In the first instance in the ‘ballpoint case’, police and prosecution were so convinced of the way in which the woman’s death had occurred that they felt no need to ask the forensic laboratory experts for scientific investigations. As is nicely illustrated by this case, there are more resources for forensic expertise than the institutionalised expertise from national forensic science institutes. Expertise can also be found in non-governmental institutes such as universities, academic hospitals, governmental and industrial research institutes. Private experts are also available. A second ascertain- ment is that expertise can be requested for different reasons. In criminal cases it is usually the police and justice who request expertise. In most cases the defence initiates a second opinion or ‘counter-expertise’; then the defence lawyer encounters the difficult task of organising that expertise.

Since the governmental forensic institutes investigate cases only at the request of police and justice and do not charge, the defence has to find expertise outside these institutes. Initially the defence also has to pay the costs of the counter-expertise. All this puts the defence in a difficult position with respect to expert evidence. Rethinking this situation, the question arises as to whether the right to ‘equality of arms’ and to a ‘fair trial’, as described in article 6 of the European Convention on Human Rights (ECHR, Treaty of Rome, 1950), has been violated?

Summarising the above, the defence lawyer will end up with the following questions, to be discussed in this contribution:

---

3 With the exception of England and Wales, where the Forensic Science Service is an agency.

4 Ian Freckelton, in Chapter II of this volume.
• where to find qualified forensic expertise?
• how to determine which (combination of) expertise is needed in a specific case?
• how to assess expertise as qualified?

The average defence lawyer will encounter problems in finding forensic expertise because he cannot submit the investigations he needs to the governmental institutes. There is no overview of all the kinds of expertise available for criminal investigations. Only the areas of expertise in governmental institutes are known, but if other expertise is needed, it must be found in universities, scientific institutes or even in forensic institutes in other countries (this applies to all parties in a case). Only a persevering defence lawyer will find the expertise he needs on behalf of his client. This will be a laborious task as the lawyer will not always be in the position to oversee the different kinds of expertise which exist. He is not really in a position to assess and chose the expertise necessary for his particular case. As a consequence, he has to put a great deal of effort into discussions with colleagues and scientists to define his needs and to locate the right scientist who will be able and willing to investigate an alternative hypothesis about the modus operandi. When an expert is found, the question arises as to whether this person can perform the investigations at the quality level needed, and later in court the judge has to be convinced of the qualifications of this (counter-) expert.

These problems in finding the right expertise were confirmed by an inquiry among Dutch defence lawyers.

The most important points of interest they put forward were the general dissatisfaction regarding the following topics:
• the absence of an overview of available areas of forensic expertise
• a lack of insight into the methods of investigation
• a lack of legal regulation of the right to counter-expertise
• a lack of regulation regarding the costs involved with the counter-expertise investigations on behalf of the defendant.

2 Expertise and counter expertise

2.1 The availability of forensic expertise

One of the major questions a defence lawyer has to deal with, is where to find the forensic expert needed in a specific criminal case. First of all he

---

5 Forensic scientists always investigate one or more possible hypotheses with respect to the modus operandi, to demonstrate whether or not these are supported by the available evidence.

6 Two inquiries were held by L. Jakobs (1996/1998) among the membership of the Nederlandse Vereniging voor Strafrecht Advocaten [Dutch Society for Lawyers in Criminal Cases].
Chapter III: Forensic Expertise and Criminal Procedure

has to find out what kind of expertise is needed and after that problem is solved, the expert must be found. An overview of all experts who have been active in the (recent) past would be very helpful but up to now no such overview exists. To obtain an overview of the potential available expertise is another question that will be not very easy to draft, as there are so many scientific institutes (governmental and non-governmental). The experts already known are those working in the governmental institutes, while the experts who have done already some forensic investigations in the past can also be located. Such a type of register could be made easily and kept up-to-date with little effort.

2.2 The forensic investigation methods

The methods of investigation, including those developed in forensic sciences, are known from literature. However, this literature will be difficult to understand for people who have not received training in natural sciences, such as lawyers. To overcome this problem, forensic scientists have to publish the background of their investigation methods, and in a way which can be understood by 'non-scientists'. Experts have a kind of 'natural resistance' to publishing information about current investigation methods, in case criminals benefit from that public knowledge. However, this hesitation has to be put aside in favour of the significance for criminal procedure. In some countries, the governmental forensic institutes have published their methods of investigation in comprehensible language. However, due to technological and scientific developments in general, investigation practices change continually, so these publications will be rarely totally up to date. Examples of very fast developing areas of expertise are DNA analyses and forensic information technology (computer crime). Information on these kinds of expertise needs updating more frequently than that on other areas.

2.3 The right to counter-expertise and the costs involved of this expertise

In most situations where the defence requests expertise in criminal cases, many problems arise. In almost all countries the defence will encounter the same type of problems. The first will always be that of convincing the prosecutor or the judge of the necessity for additional expert investigation. If the defence is successful, the request for additional expertise will be put forward at the expense of and with the help of the prosecution. Often the governmental forensic institutes will be asked to perform these additional investigations. If the prosecution or the judge are not convinced, the defence must find experts who are able to perform these investigations. The


216
disadvantage here is that the defendant will have to cover the costs. Besides this, the judge has to be convinced at the trial that the defence expert is really an expert in the opinion of the court. With these problems in mind, it is not surprising that there is a lot of discussion about expertise requested by the defence, in terms of 'equality of arms'. In Europe this situation leads to further appeals, even up to the European Court of Human Rights in Strasbourg.

3 Case law in Europe and the Netherlands

The European Court of Human Rights (ECHR, Strasbourg) is formed by the member-states of the Council of Europe, that have ratified the European Convention on Human Rights and Fundamental Freedoms (ECHR, Treaty of Rome, 1950). It is the highest court in Europe in constitutional matters relating to human rights: case law is made in this court by international judges. The decisions made by the ECHR have influence and impact on national judgements from the various European countries. These decisions are not directly nationally binding, but are important directives towards future decisions to be made in the member states.

With respect to counter-expertise, article 6 ECHR, 'the due process article', does not explicitly mention the right to counter-expertise. This right is considered to be implied in 'the equality of arms' as an important part of a 'fair trial'. Moreover, a few rights mentioned explicitly in article 6 can be seen as an aspect of a general right to counter-expertise, such as the right to hear witnesses. Below a short overview is given of the most important international (ECHR) and national (Dutch) case law in matters of expertise, over the last decade.

The cases of Bönisch vs Austria\(^9,10\) and Brandstetter vs Austria,\(^10,11\) are both concerned with criminal infringements against the Austrian Provision Law. In these cases the ECHR established the right of the defence to question witnesses and experts. The ECHR concluded: "On the basis of the right to a fair trial there must be an equal treatment of the expert for the prosecution and the expert called by the defendant". These two European cases function as milestones in European case law. Based on the judgment in these cases, biased expectations with respect to the services of the forensic expert have to be eliminated. The influence of these ECHR cases on national courts is nicely demonstrated by a Dutch example. In the Nether-
lands the Hoge Raad (Dutch Court of Cassation) ruled on the defence request for counter-expertise and stated in some judgments that these requests have to comply with at least one of the following elements:

- explicitly requested
- requested with motivation
- requested in time
- new inputs of information (insight) to be given by the expert

By applying these elements in practice, in theory the right to counter-expertise is recognised in the Netherlands.

The Mantovanelli-case showed another aspect of the right to counter-expertise from the perspective of article 6, European Convention on Human Rights, the "due process clause". This decision concerns the availability of the right counter-expert in a particular case. In this case it was impossible to give an immediate and knowledgeable reaction to the most important piece of evidence, the report of a medical expert. Jocelyn Mantovanelli was a twenty-one year old girl who lost her life after a medical operation. Her parents were the complainants in the Strasbourg court. They claimed that "the procedure followed in preparing the expert medical opinion ordered by the Administrative Court of Nancy, had not been in conformity with the adversarial principle and had given rise to a violation of the right to a fair hearing as secured by article 6 §1 of the European Convention". The court was of the opinion that the parents had been prevented from participating on an equal footing in the preparation of the expert report. The Court therefore admitted financial compensation for each of the plaintiffs for the non-pecuniary damages sustained, owing to the infringement of their right to a fair hearing.

A final, recent example of ECHR case law is that of the independent research-worker Hans Hertel versus Switzerland. Hans Hertel and Professor Blanc (of the University of Lausanne) published the results of their research on the harmful effects of microwaved food in the Franz Weber Journal. Proceedings were brought against the editor of the journal, Mr Weber, and Mr Hertel by the Swiss Association of Manufacturers and Suppliers of Household Electrical Appliances (MHEA). They claimed that the publication damaged the image of microwaves and feared that the members of the MHEA could suffer financial losses, by loss of turnover. An expert of the Food Research Institute (FRI) of the Zürich Federal Institute

12 Hoge Raad (Dutch Court of Cassation), 28-4-1992, NJ 1992, 644; Veld-of kooifazanten?
13 Hoge Raad (Dutch Court of Cassation), 1-12-1992, DD 1993, 186; Contra-expertise Pieter Baan Centrum.
14 Hoge Raad (Dutch Court of Cassation), 2-2-1993, NJ 1993, 476; Aflatoxin-arrest.
17 Hertel versus Switzerland, Judgement of 25 August 1998, ECHR, Strasbourg.
Forensic Expertise and Counter-Expertise — L. Jakobs and W. Sprangers

Of Technology (ZFIT) was consulted. This expert concluded in his report that "the interpretations of the experiments of Hertel and Blanc were of no scientific value". On appeal, the Canton of Bern Commercial Court\(^\text{18}\) dismissed the application by expressing its doubts concerning the applicability of the Federal Unfair Competition Act. Later, the appeal in the Federal Court\(^\text{19}\) was also dismissed. In his turn, Mr Hertel applied to the Commission of the European Court of Human Rights which declared the application admissible. The Commission was of the opinion that there had been a breach of article 10 ECHR, which is the right to freedom of expression (Report 9 April 1997). The ECHR tried to strike a fair balance between the economic interests of the manufacturers and Hertel's freedom of expression. The fact that the Franz Weber Journal was not a scientific review but a non-expert publication was also of importance for the Court's decision. However, the Court emphasised, referring to art.10 ECHR, that freedom of expression constitutes one of the essential foundations of a democratic society and one of the basic conditions for individual self-fulfilment, as in this case of Mr Hertel. The Court decided in favour of Mr Hertel and ordered the original plaintiffs in the Swiss court case to pay all costs.

Over the last few years the right of the defendant to counter-expertise has developed into a more clearly defined right through the above mentioned national and international judgements.

4 Acceptance of the expert by the court

Once an expert has been chosen and his investigations have resulted in a report, the question arises as to how the expert can be acknowledged by the court. In almost all legal systems it will be the judge, in his role of process-guard and decision-maker, who will decide whether the expert and the expert report can be accepted or not.

This critical phase is becoming more and more important in Europe, because in many European countries more adversarial elements are added to the mainly 'inquisitorial' systems of criminal procedure. Because of this development there will be more frequent appearances of witnesses and experts at criminal trials. In the early days of forensic science there were only a few experts who were also generally orientated as there were hardly any specialised areas of forensic expertise. However, nowadays the fields of forensic expertise have grown towards an almost infinite number of specialised areas. As a consequence the number of experts also has grown tremendously. This phenomenon of the growth of the number of experts and the corresponding areas of expertise supporting judicial 'fact-finding' is probably related to the more general tendency in our society to rely

\(^{18}\) Vevey District Court, 7 April 1992.
more often on the knowledge and skills of professionals and specialists.\textsuperscript{20} This tendency is international and independent of the existing differences in legal systems. 'New Evidence Scholarship,'\textsuperscript{21} has also shown this via an international study and comparison on the subject of evidence. As a preliminary conclusion it can be stated that the reliability of forensic expert evidence is a universal need with respect to all legal systems.

Outside Europe concern for a guaranteed quality of forensic evidence can be found in the United States of America in the Federal Rules of Evidence (FRE, 1975), which are applied in the federal courts.\textsuperscript{22} In the USA these rules have developed over time. Two important milestones can be distinguished in case law. At the beginning of the last century the general acceptance of a science was sufficient reason for the admission of expert evidence; this is known as the Frye-criterion\textsuperscript{23} of 1923. Article 702 of the Federal Rules of Evidence (FRE 702) gives a rather extensive description of the requirements for expert testimony: “If scientific, technical, or other specialised knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified by knowledge, skill, experience, training or education, may testify thereto in the form of an opinion or otherwise”. In 1993, seventy years after Frye, the criteria were developed towards more specific standards through the Daubert case.\textsuperscript{24} However, in 1998 the Advisory Committee on the Federal Rules of Evidence proposed an amendment to FRE 702. The Committee proposed adding after “or otherwise” in the FRE 702: “provided that (1) the testimony is sufficiently based upon reliable facts or data, (2) the testimony is the product of reliable principles and based upon reliable methods, and (3) the principles and methods are reliably to the facts of the case”.\textsuperscript{25}

In Europe the various countries have different methods for appointing an expert for the court. The most important legal rules or regulations will be described below. The country that has most strictly regulated forensic expertise is Austria. Since 1975 Austria has had a special Law for Experts\textsuperscript{26} The most essential subjects with respect to the role of the expert in court are regulated by this law. The rules applying to forensic experts are

\begin{itemize}
  \item \textsuperscript{20} Nijboer, J.F., \textit{Proof and Criminal Justice Systems}, Frankfurt am Main: Criminalia, Peter Lang 1997, p. 118.
  \item \textsuperscript{21} Read Nijboer, J.F., \textit{De waarde van het bewijs}, [The value of the evidence], Deventer: Gouda Quint 1999.
  \item \textsuperscript{22} Since 1975 about 34 additional states have adopted evidence codes or rules, modelled on the FRE, read also: Best, A., \textit{Evidence, Examples and Explanations}, Canada: Little, Brown and Company 1994, p 2, 157-160, 236-237.
  \item \textsuperscript{23} \textit{Frye versus United States}, 293 F w2d 1013 at 1014 (1923).
  \item \textsuperscript{24} \textit{Daubert versus Merrell Dow Pharmaceuticals}, 113 S Ct 2786, 1993.
  \item \textsuperscript{26} Bundesgesetz von 19 Febr. 1975, über den allgemein bei eideten gerichtlichen Sachverständigen und Dolmetscher (Law for the General Sworn Experts and Interpreters), Sachverständigen Gesetz Österreich.
\end{itemize}
described in two chapters, covering 12 articles. The rules cover among other things:
- the conditions the expert has to meet regarding his registration on the List [a register of available forensic experts] (2),
- the organisation and contents of the List (3),
- the requirements regarding the (scientific) field of expertise (4),
- the meaning of the oath made by the expert (5),
- the limits of the registration term (6),
- the national validity of the List (7),
- the termination of the expert's competency (9),
- the withdrawal of registration (10) and
- the reasons for removal from the List (12).

These rules are also applicable to counter-experts. This results in a very transparent position with respect to (counter-) experts in Austrian day to day practice.

France\textsuperscript{27} and Spain\textsuperscript{28} are also worth mentioning, since their Codes of Criminal Procedure describe comprehensive procedures regarding expert investigations.

Portugal\textsuperscript{29} also has some legal regulations regarding a list of (counter-) experts and expertise.

In the Netherlands more specific standards have been set recently regarding the requirements to be fulfilled by an expert involved in a specific criminal procedure. In pursuance of a murder case, in which an orthopaedic shoemaker\textsuperscript{30} appeared before the court as an expert, for the first time conditions were set regarding the use of results of forensic expertise\textsuperscript{31} as foundation for a conviction.

The Hoge Raad (Dutch Court of Cassation) recommended the following requirements with respect to forensic expertise:

a) an outline of the field of expertise,
b) a theoretical explanation of the forensic investigation method used,
c) the reliability and validity of the method used,
d) the competency of the expert; how 'skilled' or 'scientifically educated',\textsuperscript{32} experienced, certified, etc. is the expert who performed the forensic investigation in question?

The professional competencies of the forensic expert seem to be the pivot. The mutual dependence between the expert and his field of expertise is

\textsuperscript{27} Code de Procedure Penal, artt 157 and 167; Lois Decret du 31 Decembre 1974, artt 1-42.
\textsuperscript{28} Ley de Enjuiciamiento Criminal, Chapter VII, articles 456-586.
\textsuperscript{29} Codigo de Processo Penal, Livro III, Da Prova, artigo 152, 158.
\textsuperscript{30} Hoge Raad (Dutch Court of Cassation) 27-1-1998, NJ 1998, 404.
\textsuperscript{31} Two authors in this book also discuss this important statement of the Hoge Raad (Dutch Court of Cassation) Peter van Koppen and John Spencer namely in this volume.
also evident. This is valid for all the various legal systems. However, there are remarkable differences between the countries in Europe; this is confirmed by the questionnaires sent around to some of the countries.  

Consequently there is a need for more uniformity with respect to the acceptance of the forensic expert by the court. This includes, besides an outline of a field of expertise, the education, training and experience of an expert, literature about forensic investigations in the field in question and the examination and certification of the expert by independent bodies.

A recent initiative by the European Network of Forensic Science Institutes (ENFSI) is the start of an ENFSI Committee on Education and Training. Within a few years this committee will advise the members of ENFSI about the subjects under discussion in this contribution.

The implementation of the recommendations will also take years, but eventually this will lead to transparency and convergence with respect to the competencies of forensic experts in Europe.

Rethinking the above mentioned judgements it seems a necessity and a challenge to find more universal ways to get (scientific) forensic expertise implemented more effectively and reliably into criminal law procedure. The most important question to be solved is how science can be most effective in helping the court to reach its conclusions. Here we have to deal with differences in educational cultures between lawyers educated in the humanities, and forensic experts who have been educated largely in natural sciences. The “gap” between the two traditions is manifest in many ways. The humanities represent a world of languages, words, art and imagination while the natural sciences stand for mathematics, numbers and material knowledge. As a consequence of these cultural differences in education the ways of expression are also different. Differences can also be noted between experts in their manner of expression; natural scientists such as physicists and chemists expresses themselves differently than psychologists and psychiatrists.

Since experts work for the use of justice they have to make the biggest move to bridge the described ‘culture-gap’. The expert always has to bear the customer in mind as he writes down or states the conclusions of his forensic investigations in his expert report or as a witness before the court. It is the responsibility of the expert to ensure the comprehensibility of the forensic expertise to non-experts. In this way he can be very helpful in im-

33 Within the Research Project ‘Harmonisation in Forensic Expertise’, Livia Jakobs has sent a questionnaire about existing possibilities of forensic expertise and counter expertise to different European forensic laboratories. The results are discussed in the appendix of this contribution.


35 Krol, G. et. al., De trots van alpha en beta, [The Pride of Alpha and Beta], Amsterdam: De Bezige Bij 1997.

36 Johannes F. Nijboer, The significance of comparative legal studies in chapter V of this volume.
proving the transparency of forensic scientific investigations, and thus directly improve the efficiency and effectivity of the court.

5 The need for forensic expertise and counter-expertise

The need for forensic expertise is not disputed in European countries. The need for counter-expertise is also recognised, although on the average counter-experts are involved in not more than 5% of criminal cases (see footnote 32 and the Appendix at the end of this article). This is not a large amount, but seen in the context of the impact on criminal procedure and the fact that the tendency to involve counter-experts is increasing, it is important to discuss the role of the (counter-) expert.

Generally the position of the defence with respect to forensic expertise is not equal to that of the prosecution which has all the resources at their disposal. The need for counter-expertise is not limited to a certain number of expertise areas; the most frequently involved areas for counter-expertise are traffic accident reconstructions, tool mark identifications, drug analysis (heroin and amphetamines), gunshot residues analysis and paint examinations. In almost all European countries the costs of counter-expertise requested by the defence are regulated in such a way that the State bears these costs, but this situation creates some kind of control by the State. Only wealthy suspects can afford independent forensic counter-expertise investigations.

Although the Dutch Court of Cassation recognises the right to counter-expertise in theory, the aspect of the costs involved is not regulated. Neither article 591 WvSv (Code of Criminal Procedure) nor the Wet Tarieven in Strafzaken (Act on Tariffs in Criminal Cases) give guidance for compensation in cases of counter-expertise. The Dutch Court of Cassation has even stated that in a case with counter-expertise on behalf of the defendant, financing of the costs by the State is not a generally accepted fact. 37

It may therefore be concluded that the member countries of the Council of Europe try in some way to implement the right of counter-expertise for the defence in their criminal procedures; but the situation of equality of arms for the defendant has not been achieved so far.

6 Discussion

From the description above it becomes clear that most subjects with respect to forensic counter-expertise are not formally regulated in the various European countries. The disadvantages of this situation can be seen in daily practice in criminal cases. The advantages are that as long as there are no formal rules, harmonisation between the European countries can be achieved much more easily. Transparency with respect to the domains of

37 Hoge Raad (Dutch Court of Cassation), 13-5-1997, NJ 1998, 152.
the various areas of expertise, as well to the competency of the experts, will be a first step in regulation of forensic (counter-) expertise.

6.1 Areas of forensic expertise
A precise description of all the various forensic expertise areas would be very welcome. In our opinion it will be rather difficult to give precise descriptions of the fields of expertise and their boundaries. First of all, the various areas of forensic expertise have grown in the past based upon knowledge but also upon personal interests of scientists. As different areas of forensic science expertise may belong to a single basic natural science, overlap can occur between forensic experts of different areas of expertise especially in the boundary areas. In addition there always will be new developments in the various basic natural sciences, leading to new sub-areas of forensic expertise that cannot be assigned beforehand to a specific area of forensic expertise. These newly developed sub-areas will be placed, sooner or later, within one of the existing areas of forensic science, by a management decision by a forensic institute. Just occasionally management will decide in an early stage to create a new area of forensic science. These circumstances will result in differences in areas of expertise between the various countries, not only in Europe. As a consequence of these natural developments, there is no single definition of an area of forensic expertise which is acceptable to all experts in that area or for the forensic institutes in Europe. On the other hand, there is some kind of mutual understanding of the rough contents of most areas of expertise. This is best demonstrated by the world-wide acceptance of the list of areas of expertise used by Interpol, as given by the organisation committee of the three-yearly Interpol Symposium on Forensic Sciences.

This understanding and acceptance however, is limited to the forensic scientific institutes. In most criminal cases we have to deal with more than one area of expertise, in order to explain the case completely. This stimulates the management of a forensic science institute to maintain a few generalists in the institute who are able to oversee the complex cases that occur regularly. The existence of forensic science generalists helps to overcome the problem of specialisation in expert areas within the institutes. Precise descriptions of and exact boundaries between the various areas of expertise are not a necessity in those institutes.

To achieve understanding and acceptance of the fields of expertise also outside the forensic science institutes, and in particular among the users of the results of forensic scientific investigations, a more public and transpar-

38 Examples are: environmental crimes and computer crimes (or information/communication technology).
39 In this context a complex case is a criminal case in which more than one forensic expertise area is necessary to explain the way the criminal fact occurred; for a recent Dutch overview of commented complex cases read: Malsch, M. and J.F. Nijboer (eds.), Complex Cases, Amsterdam: Thela Thesis 1999.
ent debate will be necessary. In addition to the necessary explanation of the investigations executed before the court, \(^{40}\) frankness should be created towards the judicial partners and their counterparts. We mentioned earlier that in some countries there were already attempts to create this needed openness with respect to the investigation methods applied in the forensic institutes (see footnote 7). The most widely used method is the publication of a booklet in which the applied methods are explained in terms understandable by non-scientists. Because of scientific developments such a booklet must be updated frequently. Then there is still a risk of not describing the state of the art for areas of expertise which are subject to very fast development. \(^{41}\) The advantages of computer and communication technologies can be used to overcome the current problems of up-dating the investigation methods and techniques. The creation of a virtual network of forensic scientists in Europe (or even world-wide) will be a first step towards the solution of these problems. In a period of globalisation \(^{42}\) where, due to changes of mentality, the traditional borders are fading, the advantages of on-line technology might be very helpful for the creation of a "community". This "forensic science community" consisting of experts from governmental forensic institutes and those outside, can develop websites where the state of the art for the various areas and sub-areas of expertise are described by the experts themselves. Also chat-boxes could be started where the latest developments can be discussed. This "Community of Active Forensic Experts" (CAFE) can guarantee safe-guarded (protected and secured) communication channels.

This proposal might encounter some scepticism among forensic scientists, as they do not like to advertise the newest developments to criminals. However, one must also realise that as soon as a case in which the latest developments are used is brought to court, this investigation method is open to the public and also to criminals who are able to understand the scientific consequences. On the other hand, in most criminal cases the criminal seems to take few precautions to minimalise the possibility of identification by one or more traces left by him at the crime scene.

Even today fingerprints \(^{43}\) are found at crime scenes and this still regularly leads to the identification of suspects. Forensic scientists should be encouraged to surmount this emotional threshold and create an area, where (interdisciplinary) information-exchange can take place with colleagues outside forensic institutes and with judicially trained people, such

\(^{40}\) Before the court very detailed explanations, covering only a limited number of expertise areas, can be given, especially when experts from the prosecution as well from the defence are present.

\(^{41}\) A nice example is the area of information and communication technology.


\(^{43}\) Fingerprint identification is one of the oldest methods of identification expertise and in use for many decades; the use of fingerprint-databases is widespread.
Chapter III: Forensic Expertise and Criminal Procedure

as prosecutors, judges and defence lawyers. "CAFE" could be this communication area.

6.2 Competency of forensic scientists
The governmental institutes in most European countries have described education and training programs for almost all the various areas of expertise they practice. These programs are intended for new employees who have to become reporting experts. These education and training programs are not accessible to others outside the governmental institutes, who would like to become forensic experts. The contents of these education and training programs are not known outside the forensic institutes. In most countries it is up to the judge to decide if a person will be accepted as an expert or not. The judge generally has to take this decision without knowledge of the scientific expert areas and has to rely on his own impressions.

In this situation the forensic science institutes might be very helpful by publishing the competencies an expert has to fulfil before he is allowed to undersign forensic expert reports and to testify in court. The expert competencies will contain the necessary education, training and practical skills. In addition the examination procedure, preferably carried out by an independent commission, and the term of validity of the certification should be described. These published competencies and means of examination will serve at least as some kind of guide for the judge to help him to decide about the acceptance of any expert. On the other hand, it will also be a guideline for those people outside governmental forensic institutes, who want to become (private) experts.

The institution of an independent examination (assessment) committee, will be beneficial for all parties involved and a register of approved forensic experts can be set up and maintained by such a committee. Harmonisation with respect to competencies of forensic scientists in the areas of natural sciences will be supported by the initiatives taken within ENFSI by its Committee on Education and Training.

6.3 Registers of forensic experts
With exceptions in Austria, France and the Netherlands (forensic handwriting experts) and to some extent also in Poland and Portugal, there are no available lists or registers of practising forensic experts known to us. The ultimate solution, via an assessment committee, to create complete lists for all expert areas will take a considerable amount of time.

---

44 Principally there should be described competencies for all employees in forensic science institutes.
45 The certification-term is the period immediately following the examination (assessment) over which the scientist is allowed to operate as an expert. Before the end of the term the expert should pass a 're-assessment' in order to continue his work as an expert. In case of failure to pass the (re)assessment he should be trained and/or educated until he can be assessed again with a positive result. Regular re-assessment of expert is necessary to ascertain that the expert works along the state of the art of that moment.
The education and training programs must be drawn up and agreed upon, the matters of examination to be designed, the validity-term of the assessment agreed and the independent assessment committee installed. Unless some local or national initiatives are already taken, a complete introduction and acceptance will take some years. A short-term solution could be to make a list of all experts accepted by the court over the last few years.

Such a provisional list can be drawn up very easily on national levels and will already be of great help to defence lawyers in their search for counter-experts. In this manner those experts who are not often asked to support criminal investigations, and are therefore not located at the governmental forensic institutes, will also be accessible. These national or, perhaps further in the future, international lists or registers of available forensic experts (per expert area) could also be published on the 'CAFE' website. Thus, transparency with regard to existing experts can be achieved and maintained easily and at short notice. This matches with the movement of the growing impact of technology and science on our society.\(^{46}\)

### 6.4 Costs involved with expert investigations

The imbalance between prosecution expertise and defence expertise is mainly determined by the costs involved. The prosecution has almost unlimited access to the forensic experts of governmental forensic institutes. In most situations, the defence lawyer is dependent on the willingness of the prosecution and/or the investigating judge to accept the costs involved with counter-expertise. This implies that the defence bears the additional risk of non-compensation of costs incurred if he brings in one or more counter-experts. In the worst case, the defendant has to bear all costs involved in that counter-expertise. On top of that, it has to be mentioned that, in case of compensation of the costs by the court, the rate per hour or the total budget made available for counter-expertise may be limited. The consequence of this limitation can be that the 'best' expert may be too expensive and that a less experienced expert has to perform the investigations (with the risk of non-acceptance by the court). Our conclusion has to be that equality of arms can be fulfilled only if the defendant has enough financial resources.

### 7 Conclusions and recommendations

What we aim for is to reach a 'double-transparency' of the European forensic expertise market. This means a transparency of the availability of practising qualified forensic experts, and transparency of available forensic investigation methods. These will enable lawyers to obtain a better insight into forensic expertise.

---

Chapter III: Forensic Expertise and Criminal Procedure

To achieve this there is a need to develop a set of standards on the requirements for becoming an acknowledged forensic expert; not only from inside the governmental forensic institutes, but also for people outside these institutes. As a consequence, the matters of tuition and certification as they are used now in governmental institutes must become public and the assessment of (prospective) experts has to be made by an independent 'Committee of Acceptance'. Such a committee should consist of scientists, lawyers and 'ad hoc' appointed practising forensic experts of the field concerned in the assessment. After a positive assessment, the expert can be added to the expert list or register by the 'Committee of Acceptance'. The next step would be to add the acknowledged expert to the forensic expert list or register. This could be a national register or even a European register, if the national registers are brought together in one database. The transparency of forensic investigation methods will be achieved only by immediate publication of newly developed methods and techniques and a 'public' debate on these subjects. Within Europe ENFSI is the organisation best fitted to take initiatives in this respect.

There is also a need for discussion with scientists working outside the forensic science area, such as those from universities, other scientific institutes and private researchers. Communication and co-operation between the representatives of the same sciences and disciplines should be stimulated. Consultations must be encouraged between the respective experts, for example by visitations of the forensic institutes by collegial 'visitation commissions'. Where the quality of case-work can be assessed by the independent national accreditation body, the visitation commissions will assess an institute on its scientific quality level.

One of the possible solutions for the inconveniences described in this contribution might be an interdisciplinary 'community' in the form of an electronic network covering all people involved. Such a 'Community of Active Forensic Experts' should consists of (forensic) scientific experts, lawyers and other people involved or interested in criminal justice procedures.

An electronic network makes it possible for a defence lawyer to look for the right (counter-) expert, but the public prosecutor and the (inquiry) judge will also benefit from that network and all the easily accessed forensic information. In addition to the use of the network for judicial purposes it can be of value for more scientific purposes. The problem to overcome is that an organisation must be found which is interested in starting to build the 'Community of Active Forensic Experts' and then to maintain it. The 'Community' will be successful only if all people involved and interested in

47 The quality of the forensic investigation methods can be secured by accreditation by an (independent) national accreditation body. This development is strongly stimulated by ENFSI and the Quality Assurance Working Group. In Europe the governmental forensic institutes are becoming accredited more and more frequently.

criminal justice become members and if the information is up to date and accessible to all members. The question that now remain is, who will take the initiative to create this 'Community'. In this context one could think of the International Associations of Prosecutors and/or Barristers as being interested in facilitating a 'Community' as described above.

Lawyers in criminal procedures must be encouraged to enhance their active and critical attitude towards the quality of forensic expertise. In our opinion the governmental forensic institutes are the most responsible institutions, appointed to watch and guide the transparency and the understanding of scientific expertise for forensic purposes.

Europe-wide the number and impact of alterations and additions to national laws in a converging direction is rapidly increasing, which is a good reason to focus on European projects as described here. We realise that the creation of a 'Community of Active Forensic Experts' (CAFE) will be challenging and time-consuming. However, a good communication-channel for forensic experts and lawyers will be a sound basis for the necessary 'double transparency' of the European forensic expertise market. The proposed 'Community' will: 1) make an overview of available forensic experts, 2) give insight into current forensic investigation methods and 3) make the existing education, training and certification programs for forensic experts, accessible and transparent to future (counter-) experts.

Judges, public prosecutors and defence lawyers in Europe will benefit from the opportunities to have a better access to all existing expertise. In the longer term this will lead to a better understanding and interpretation of the results of forensic (scientific) investigations by lawyers. Finally, if the situation of complete transparency in the criminal justice area is achieved, a major step will be made towards the 'equality of arms' as a part of the fair trial as intended by the European Court of Human Rights in Strasbourg.

Appendix

Investigation results of questionnaires about counter expertise

Different questionnaires were sent to the participants in the investigation part of this project “Harmonisation in Forensic Expertise”. Two of the questionnaires dealt with the subject of counter-expertise. The “Counter-check” questionnaire was sent to 185 participants in 15 countries, of which we received 27 (15%) back completed. The questionnaire “Additional Forensic Expertise” was sent to the Forensic Laboratories in the same 15 countries of which 10 were returned (67%). The differences in response between the two questionnaires is caused by the fact that the “Counter-check” questionnaire was also sent to lawyers. The “Additional Forensic Expertise” questionnaire was sent only to governmental forensic laboratories. As explained by Leo Toornvliet, in the introductory chapter of this book “The Focus of this Book”, in his contribution “Methodology of the research”, the response of the forensic laboratories was high compared with the low response from the lawyers.

The low number of questionnaires returned causes a very careful interpretation of the results. Also the spread in the answers given, even by different respondents from the same country, compels us to make a reserved interpretation. However, a general impression of the situation with respect to counter-expertise can be given.

Generally we make a difference between:

• counter-check (or counter-expertise), as a completely new investigation by different investigators in a different laboratory based on a part of the original trace material that has not been used in prior investigations.

• second test (or re-testing), the investigation can take place within the organisation where the first investigation took place.

• second opinion, as another (external) expert will evaluate the investigation results again.

Results of the questionnaires

The right to a counter-expertise seems to exist in most countries, with the exception of Sweden where the defence usually trusts the investigations of the national forensic laboratory (SKL). It seems that the “right to counter-expertise” is generally accepted and in some countries laid down in the law (Austria, France, Italy, Latvia, Portugal, Russia, Slovakia, Spain and Turkey) and sometimes only for a limited number of types of expertise (Netherlands).

When we look at the right of the defence to request (demand) a counter-expertise, the answers are not clear enough and a study of the various national laws has to be made. In most countries where the right to counter-expertise is fixed by law it is the judge who decides on the acceptance of a request.

A remarkable answer was obtained from Germany where the respondent of the BKA (Wiesbaden) stated that “a right to counter-expertise is not necessary because of the fact that the quality of forensic investigations is guaranteed only by the established forensic institutes”.

The right to counter-expertise will expire in a few countries (Austria, Turkey) but only after the final (definitive) verdict. With just a few exceptions there seems to be no term within which counter-expertise has to be requested.

Only Poland seem to have explicitly regulated a second opinion where they do not have counter-expertise.

The costs of the counter-expertise can be carried either by the state or the defence and on this subject many different regulations exist in Europe. Generally the costs of counter-expertise are carried by the requesting party, only after acceptance by the judge or prosecutor the costs of the defence expertise will be paid by the government. Some countries have the opportunity to order the convicted person to pay the costs of the counter-expertise (Poland, Portugal).

If the first expert investigations are done by a police agency the counter-expertise can be carried out by a different police agency only in England and Spain and for fingerprints also in some other countries.
An expert may be appointed by the defence to perform the counter-expertise in most countries, with the exception of Austria. In Austria it is always the judge who appoints the counter-expert.

In most countries it is possible to refer the counter-expertise investigation to a different established laboratory or expert, with the exception of Germany. Foreign or private experts or institutions can also be chosen for the counter-expertise, but in most countries this depends on the decision of the judge.

A second test or re-testing on request of the applicant or another party is only regulated in Slovakia, Spain, Sweden and Turkey. In almost all countries the re-testing will be done by another expert and in some countries (with more than one forensic institute) also in another laboratory.

An overview of the available experts in a country in the form of a Register or a List of experts is present only in Austria, France, Italy, Poland and Portugal. In the Netherlands there are lists of handwriting experts and forensic accountants.

In principle the expertise areas involved in counter-expertise cover all expertise areas. The most involved in decreasing order are drugs, tool marks, traffic accident reconstructions, blood alcohol analysis and fingerprints. The number of counter-expertise investigations in the countries questioned is not exactly known by the respondents but it is guessed by all that it will be a low percentage compared with the normal expert investigations.

The respondents to the questionnaire seem to be content with the current regulations in their respective countries with respect to counter-expertise.

Comments
Based upon the questionnaires received, we formed the impression that in most countries the judge plays a very important role in the acceptance of experts and in conceding counter-expertise. Counter-expertise is possible in the countries questioned, with the exception of Poland. However, there are a lot of obscurities with respect to the appointment of the counter-expert and the costs involved. Only if the defendant has large financial resources can he permit himself counter-expertise at his own expense. In all other situations he is strongly dependent on the judge or prosecutor. A very positive outcome is that there are already some countries with a register of available (counter-)experts.

These results are remarkable considering that there is also a feeling of contentment with the current regulations, although we were not able to put the same questions to suspects or defence lawyers. It is noteworthy that there are many differences in the regulations on the subject of counter-expertise in the various countries. With the idea of equal treatment of the citizens in Europe and keeping in mind the wish for strengthening the third pillar of the European Union, harmonisation of the regulations with respect to counter-expertise seems to be necessary.

References
Freckelton, I., in chapter II of this volume.
van Kampen, P. T. C, in chapter III of this volume.
van Koppen, P. in chapter III of this volume.
Chapter III: Forensic Expertise and Criminal Procedure

Krol, G. and others, *De trots van alpha en beta* [The proud of alpha and bêta], Amsterdam: De Bezige Bij 1997.


Spencer, J. R., in chapter VII of this volume.

5 Information Technology

The Development and Regulation of New Forensic Investigative Methods

Hans Henseler and Jaap Roording

Abstract

Crime investigations are increasingly faced with evidence in computers, storage media, telecommunications and data communications. This is not only true for computer-related crime but also for traditional crime. Reason and deduction from traces of evidence are traditionally based on forensic science. Searching and finding evidence in digital information requires a new forensic science and new laws. This article addresses the development of forensic computer science and regulation of computer crime law in the Netherlands and some aspects of international harmonisation.

1 Introduction

The days of Sherlock Holmes are over. Many things have changed in the world around us. An ever-increasing flow of information is sent through computers, fax or mobile phone communications. Computer systems and electronic organisers are replacing paper administrations and diaries and criminals operating in worldwide organisations are using this kind of modern equipment. Figures show that the number of computers and digital storage media that are seized by police is continually increasing. Intercepting data communication in wiretaps used to be restricted to fax messages. Today, a wiretap on a high-speed modem connected to an Internet provider will give a large variety of message formats. Analysing this kind of evidence requires a fundamental change of methods, which has resulted in fast development of forensic computer science. In addition to technical measures also new legislation is required to regulate the application of new investigative methods and gathering of evidence. In paragraph 2 we will first address basic types of computer crime as a starting point for describing the new challenges and developments in forensic computer science and the law in paragraphs 3 and 4, respectively. We conclude with an evaluation that puts these new developments into perspective.
Chapter III: Forensic Expertise and Criminal Procedure

2 Computer crime

There is no exact global definition for computer crime, sometimes also referred to as computer-related crime. Rather, functional definitions have been used to describe the phenomenon. On the one hand it can involve many criminal activities that are traditional in nature but have a new dimension through the use of a computer. For example theft, fraud, forgery and mischief, all of which are generally subject everywhere to criminal sanctions. On the other hand the computer has also created a host of potentially new misuses or abuses that may, or should, be criminal as well.

The *International review of criminal policy – United Nations Manual on the prevention and control of computer-related crime* (1) categorizes 5 common types of computer crime. The interested reader is referred to the original document for elaboration on these issues. We will give a short overview below:

1 *Fraud by computer manipulation:* Intangible assets represented in data format, such as money on deposit or hours of work, are the most common targets of computer-related fraud. Modern business is quickly replacing cash with deposits transacted on computer systems, creating an enormous potential for computer abuse. The organized criminal community has frequently targeted credit card information, as well as personal and financial information about credit card clients. The sale of this information to counterfeiters of credit cards and travel documents has proven to be extremely lucrative. Assets represented in data format often have a considerably higher value than traditionally targeted economic assets, resulting in potentially greater economic loss. In addition, improved remote access to databases allows the criminal the opportunity to commit various types of fraud without ever physically entering the premises of the victim.

2 *Computer forgery:* Computer forgery is the alteration of data in documents that are stored in computerized form. In the above examples, computer systems are the target of criminal activity. Computers, however, can also be used as instruments to commit more traditional forms of forgery. The computer created a new library of tools in order to forge the documents used in commerce. A new generation of fraudulent alteration or counterfeiting emerged when computerized colour laser copiers became available. These copiers are capable of high-resolution copying, the modification of documents and even the creation of false documents without benefit of an original, and they produce documents whose quality is indistinguishable from that of authentic documents except by an expert.

3 *Damage to or modification of computer data or programs:* The unauthorized modification, suppression or erasure of computer data or functions with the Internet to hinder normal functioning of the system is clearly criminal activity and is commonly referred to as computer sabotage.
This category of criminal activity involves either direct or covert unauthorized access to a computer system by the introduction of new programs known as viruses, 'worms' or logic bombs. Computer sabotage can be the vehicle for gaining economic advantage over a competitor, for promoting the illegal activities of ideologically motivated terrorists or for stealing data or programs (also referred to as 'bitnapping') for extortion purposes. In one reported incident at Ontario, London, in 1987, a former employee of a company sought unsuccessfully to sabotage the computer system of the company by inserting a program into the system that would have wiped it out completely.

4 Unauthorized access to computer systems and service: The desire to gain unauthorized access to computer systems can be prompted by several motives, from simple curiosity, as exemplified by many hackers, to computer sabotage or espionage. Intentional and unjustified access by a person not authorized by the owners or operators of a system may often constitute criminal behaviour. Unauthorized access creates the opportunity to cause additional unintended damage to data, system crashes or impediments to legitimate system users by negligence.

5 Unauthorized reproduction of legally protected computer programs: The unauthorized reproduction of computer programs can mean a substantial economic loss to the legitimate owners. Several jurisdictions have concluded that this type of activity should be the subject of criminal sanction. The problem has reached transnational dimensions with the trafficking of these unauthorized reproductions over modern telecommunication networks.

In modern information society computer crime should be identified as a serious threat and as such it is an emerging challenge for law enforcement (2). Due to its nature, special technical counter measures are required that are not restricted to the forensic analysis of computer evidence but also require advanced law enforcement techniques for digital investigation. For example, Internet requires new techniques and procedures to enable the police to enforce laws on the electronic highway. Also public prosecutors should be aware of new telecommunication and computer technology. Typical examples of computer crime are hacking (i.e. breaking into a computer system), phreaking (i.e. manipulating the phone system), software piracy and spreading malicious code (i.e. computer viruses). These emerging crimes require a specialised computer crime law such as the computer crime law been introduced in the Netherlands in 1993. Amongst other things, this particular law makes unauthorised access to any password-protected computer system illegal.

Other examples of crime involving the use of computers, such as child pornography on the Internet, money-laundering, illegal gambling on the Internet, credit card fraud and others, should not be viewed as computer crime but as digital equivalents of their 'real world' counterparts. Tradi-
Chapter III: Forensic Expertise and Criminal Procedure

3 Forensic computer science

3.1 Challenges in forensic computer science

Although computer crime is viewed as a serious threat it is not the driving force behind the development of forensic computer science. The investigation of traditional crimes like murder, fraud and drug trafficking require new techniques since organised crime is using modern communication techniques (e.g., email, fax, GSM) and computerised administrations (e.g., PCs, electronic organisers). We must conclude that the introduction of computers in many areas of our society has led us to a point where traditional methods for investigating and analysing evidence are no longer adequate in the new information society.

Forensic analysis of computer evidence, or in short computer forensics, can be subdivided into three major categories (see Bates (3) for additional view on the fundamentals of computer forensics): Embedded computer systems, Open computer systems and networks, Communication systems. This subdivision largely reflects the nature of the items that are seized or intercepted and that are submitted for further forensic investigation. Consumer electronics belongs to the first category, for example an electronic organiser or a mobile phone. Accessing information in embedded computer systems requires analysis of the hardware using special equipment. Open systems refer to items such as computers and storage media that adhere to open standards and that are accessible via software rather than hardware, for example MS-DOS, Wintel computers or plain standard storage media such as IDE hard drives, computer tapes and disks. Not only data but also software in open systems may contain interesting traces of evidence and should be investigated. Traces of evidence are found in both embedded systems and open systems by investigating physical items, e.g. electronic organisers, PCs, discs, tapes, etc. In contrast, items found in communication systems are not physical but are found in, for example, digital transmissions.

3.1.1 Embedded computer systems

Embedded computer systems, i.e., computer systems integrated into hardware that was designed with a special purpose in mind, are common in the field of consumer electronics. This is a field that has experienced a tremendous number of new developments over the past five years. Especially the explosive growth of the digital telecommunications, e.g., mobile GSM (DCS800 in Europe or DCS1800 in the US), the large-scale introduction of smart card applications and the revival of the electronic organiser, have all greatly influenced the development of new forensic techniques. Electronics have become more user friendly and are able to store information which
may be interesting when searching for traces of evidence. Hardware investigations are further complicated by the continuing miniaturisation in combination with increased functionality, e.g. organiser, phone, fax and e-mail.

Investigating evidence traces in electronics requires a hardware approach. Skilled technicians with a broad knowledge of computer architectures are essential to analyse pieces of hardware when looking for memory locations. Sometimes, even removing the back panel of an electronics device and putting it back together requires special equipment and experience. This is even more true for encapsulated integrated circuits (ICs), for example in the case of a smart card. The introduction of multifunctional smart card applications (i.e. for payment, insurance, and phone) simply begs for new forensic methods. And this will become more interesting once biometrics (e.g. fingerprint, hand) are used so that digital traces have larger potential to deliver important evidence. Hardware investigation of smart cards and ICs require either chemical solvents or strong acids that leave the electronics undamaged but remove surrounding epoxy in a fast and clean way. Moreover, investigating microelectronics requires miniature equipment, and a microscope is needed to analyse the internals of an IC. Measured signals can subsequently be analysed using standard methods or with special purpose software. Manual analysis is not feasible owing to the high clock speeds yielding millions of samples per second. However, analysis is still essential. Sometimes it suffices to examine data only and look for particular information. In other cases it may be necessary to analyse the firmware (software in the embedded hardware) before a good interpretation or recovery of the information is possible. Since embedded hardware mostly operates with special purpose processors using an unknown machine instruction set, forensic analysis becomes a difficult and laborious task.

Why analyse the hardware of an embedded system in such detail? It is tempting to think that a good manual will yield all information that is stored in the equipment. For example, both mobile phones as well as electronic organisers can be accessed using the keypad. However, things are not what they seem to be. Firstly, making a memory dump, i.e. a bitwise copy of the digital memory contents, is more reliable and faster than manually copying all information. Secondly, memory may contain traces of information that has been erased by the user and which is not accessible normally. Removing information from an index does not always imply that the information has been erased in the memory. In case of broken equipment, making a memory dump may be done in a final resort to recover any information at all. Finally, as it turns out in many cases, the computer will keep more information in records than the user can access. For instance, it may be possible to discover in which chronological order information was entered into the system.
3.1.2 Open computer systems and networks

Open computer systems and networks are general-purpose devices that have operating systems that enable the loading and execution of new programs to provide new functionality. The major changes in the forensic investigations of open systems are caused by the rapid development of the personal computer (PC). Well-known PC types are the IBM compatible PC with the MS-DOS operating system and the Macintosh from Apple, the first PC with a graphical user interface. In the 1980s, Unix was the main operating system on minicomputers and workstations in computer networks. PCs were used mainly as stand-alone systems. In the late 1980s and in the beginning of the 1990s, the Novell network enabled PCs to connect to a server in a network. Until five years ago the MS-DOS operating system played a central role in the forensic investigation of storage media and operating systems. With the arrival of first Windows for Workgroups 3.11 followed by Windows 95, Windows NT 3.51, 4.0, Windows 98 and Windows 2000 a new trend was set that greatly influenced the forensic investigation of open systems. Operating systems are without exception graphical, new file systems are being used (FAT-32 and NTFS) and operating systems are object-oriented. A thorough analysis of a PC requires new methods, new software and a new approach. The shift from stand-alone to network PCs further complicates the analysis of stored information.

In contrast to digital electronics in embedded systems, PCs and storage media in open systems are not opened with screwdrivers or probed with logical analysers. Instead they are probed and processed with software that can be installed through the operating system of the device or storage media under investigation. Software to copy and search information and software to write special programs that access information that would otherwise remain inaccessible. Most investigations have to deal with MS-DOS and increasingly with Windows computers as well as removable storage media, e.g. computer tapes and disks that may contain gigabytes of information. Knowing how to approach the open system is essential. Removable media may have different physical formats (i.e. 5.25 inch versus a 3.5-inch disk) as well as different logical formats. A pitfall is the 3.5-inch disk that turns out to be used on a machine writer rather than on a PC. (See (4) and (5) for a discussion on the forensic analysis of floppy disks). Computer centres at common companies and universities have experience with a large variety of different digital media. The equipment that has been developed for them is expensive but can speed up the forensic investigation considerably. Accessing zeros and ones is the first step. Next step is accessing the actual information that is represented by the zeros and ones. Envision a relational database with 100 data tables. Accessing the information in one table may not be sufficient. Accessing the entire relational database could be essential to find the required evidence. In cases where relations are hard-coded in software this will probably imply that not only
the data but also the original software and perhaps the operating system must be restored.

So far we have only discussed the analysis of storage media. The name ‘open system’ may give the impression that open systems are not or cannot be secured. In reality, open systems support a large variety of security mechanisms because they are open. Open standards, for example the Wintel standard, enable many different hardware and software manufacturers to incorporate their own security module. PC security software restricts file access and encrypts information before it is stored. In order to analyse traces of information it is necessary to analyse these security modules and to study their effect on the information. In some cases the operation of programs has to be analysed in detail, disassembling every single instruction, in order to bypass the activated security mechanisms. This is better known as reverse engineering. With respect to security by encryption it is interesting to mention that many countries, e.g. the US, have export regulation rules prohibiting the export of strong encryption for the sake of national security (the interested reader is recommended to read (6) and (7) that give an exciting, but not necessarily always correct, overview of the history of national security and cryptography). Since most software products are distributed worldwide this implies that in one way or another export regulation rules have to be met. In many cases reverse engineering will help to find flaws in seemingly strong security products. Reverse engineering is a (laborious) method to break down the design of a computer program to understand its operation. In some cases a program is actually re-engineered to implement the encryption routine on a fast supercomputer to break the security mechanism using brute force. Speed, however, is not always essential. In some pin-code systems only ten thousand trials are necessary in order to try every possible key combination. With a machine that does two tries per minute, it will take one week on average to break the code. Obviously, such an attack will not succeed for security systems that restrict the number of trials.

Both analysis of information storage and software require knowledge of the underlying operating system. Analysis of complex operating systems, e.g. Unix, Windows NT and even Windows 95, is essential to computer forensics. In (8) the term ‘Unix Forensics’ is introduced to emphasise complexity of the forensics that is required to capture data in computers running Unix. These systems will register actions of identified users in various ways. Advanced Windows programmers know that information concerning the use of the system is stored in the system registry and countless configuration files on the hard drive. Moreover, systems running multitasking operating systems function as nodes in a network and may contain information residue of communications from the network. Forensic investigation of computer networks is essential to isolate traces of computer hackers that have penetrated the network security and have entered a computer system.
Chapter III: Forensic Expertise and Criminal Procedure

With the current explosion of Internet connectivity and the increasing capabilities for electronic payment as well as e-commerce, computer hacking is once again a growing phenomenon that requires thorough investigation. A detailed discussion of hacking is beyond the scope of this article and we refer the interested reader to books on computer hacking, for example, (9), (10), (11) or (12).

3.1.3 Cryptography

The past few years cryptography has become of increasing importance to forensic computer science. For an authoritative introduction to the field of cryptography see (13). Firstly, the increased speed of personal computers has enabled the use of cryptography in virtually any security application. Secondly, there is more privacy awareness and users are becoming more and more security minded when dealing with computer networks and e-mail. In such applications, cryptography can be a serious obstacle for a forensic investigation. It can be safely assumed that this problem will further worsen once stronger encryption becomes commercially available. From the point of view of prevention this can be considered good. Too often others can easily read electronic information and privacy of customers is not always that well protected. More encryption wouldn’t hurt and should perhaps be made obligatory from a privacy point of view. At the same time, however, one should realise that cryptography in the hands of a criminal organisation is a dangerous weapon that can be a serious threat to society. Either key-recovery schemes or key-escrow schemes in combination with a Trusted Third Party (TTP) system will hopefully present a solution for this dilemma. The main condition will have to be that only a judge may order the disclosure of the key needed to decrypt the encrypted information.

At this point it is good to mention that cryptography also plays another part in forensic computer science. Many results of forensic investigations will be attached to the report in digital format, for example on a computer disk. To guarantee the authenticity of the digital results, a secure hash function is used. A secure hash function transforms a string of characters, i.e. a message, into a fixed-length number, called hash value, which is mentioned in the report. The hash value is secure which means that it is highly unlikely, nearly impossible, for two different messages to have the same hash value. The Secure Hash Algorithm (SHA-1) is one of the state-of-the-art hash algorithms that has been developed by NIST (US National Institute of Standards and Technology) and can be found on the Internet as standard FIPS 180-1. The Forensic Computer Science Department of the Netherlands Forensic Institute has implemented the SHA-1 algorithm that has been certified by NIST.1 This implementation is used to secure digital evidence that is distributed with the report of the forensic investiga-

1 http://csrc.nist.gov/cryptval/dss/dssval.htm

240
In (14) it is reported that even CD-ROMs can be altered which underlines the need of securing digital evidence by cryptographic means. We can expect to see similar applications of cryptography for authentication in the near future. Possibly computer forensics will also have to answer questions regarding the strength of such digital signatures.

3.1.4 Communications systems
Forensic analysis of data in communications systems focuses entirely on the content of digital transmissions when they are intercepted. In a relatively short time the fax has become a very popular means of communication. It has been and perhaps still is the most important form of data communication encountered in criminal investigations. In the early days, fax messages were a subject for forensic computer science research. However, the highly standardised communication protocols for fax transmissions soon led several commercial companies to develop turn-key solutions for intercepting fax messages. These solutions have been integrated in modern wire tapping equipment. Fax communication was no longer a priority in forensic computer science. With the introduction of high-speed modems the need for analysing data communication once again has gained top priority. Until some years ago, forensic analysis of modem communication was restricted to rare cases of computer hacking or software piracy in which suspects used modems to connect to Bulletin Board Systems (BBS) and dial-up computers. As the Internet and World Wide Web (WWW) have experienced an exponential growth and because high-speed computer modems have enabled serious on-line applications, modem communication plays a central role in the communication of information and it influences the development of forensic computer science.

In contrast with fax communication, Internet communication follows 'open standards' that change every week. Internet can deliver multimedia content and potentially provides much more bandwidth than fax to communicate information in an organisation. Internet and WWW protocols have become more complex and may require an effort that sometimes even outranges reverse engineering of software. The OSI-layer model is a common model used in describing communications systems from the electric signals in the physical transport layer to user data that is communicated in the application layer. Every layer adds its own information by assembling new packets of information that have to be routed over the physical infrastructure. Well-known protocol keywords, e.g. TCP/IP, ATM, PPP, POP, HTTP, HTML, SSL and others, give a new dimension to forensic computer science. Analysing layer after layer can be a laborious task even when the used protocols are known. Sometimes, analysis may yield interesting information about the sender and receiver. Information may also be lost. If compression techniques were used, a detailed analysis of the partial data is required when attempting to recover as much information as possible. This requires advanced knowledge of network protocols and information
encoding techniques in combination with good programming skills to convert raw data into readable (or visible or audible) information.

Currently, new techniques age quickly. In the upper layers of the OSI model (application-oriented) new protocols or message formats are being introduced at high speed. This has become possible through the introduction of plug-in technology that allows www-browsers to plug in new software to deal with new data formats. Developments such as Java, COM (for Common Object Model) and the distributed version (DCOM) allow an almost instant spreading and online installation of Java applets and Active-X software components in computer systems. Today, the already enormous flow of information is increased even further by so-called push technology that delivers information automatically to the user. The stand-alone application of today is the network application of tomorrow. Perhaps new standards such as DCOM and Corba will have the greatest impact on forensic analysis when data objects are actually distributed over an entire computer network still enabling a single point of access. Being able to preserve all information stored in distributed compound document storage will make analysing clusters in a fragmented FAT-16 file system look like child's play.

Knowledge of data communication and information encoding is not sufficient. To be able to intercept messages, knowledge of the telecommunication infrastructure is essential. This is true for both the fixed and the mobile infrastructure. Service providers will compete by offering different kinds of services to their customers. In mobile telephony, both the handset as well as the infrastructure may contain information that can prove to be essential evidence, for instance, pre-set numbers, voice-mail and dialled numbers.

3.2 Harmonisation of forensic computer science
Faced with the emerging computer crime and challenges of forensic computer science, a co-ordinated approach is required. This approach should take both the national and international situation into account. Below we will present an overview of the national developments in the Netherlands during the 1990s and the involvement of law enforcement and forensic computer scientists in international networks.

3.2.1 National harmonisation
In the Netherlands a three-layer pyramid model was introduced at the beginning of the 90s. The pyramid organisation is meant to support the development of new methods for forensic analysis and investigation of computer-related crime. The top of the pyramid is referred to as the 3rd line and is formed by the Netherlands Forensic Institute (NFI, the former Gerechtelijk Laboratorium) and the National Criminal Intelligence Division (NCID, in Dutch Centrale Recherche Informatiedienst). The 3rd line supports
the 2nd line which consists of five special Computer Crime Units (CCUs). Each computer crime unit covers one police region in the country where it supports the 1st line basic police operations.

Initially, emphasis was put on the collaboration between 3rd and 2nd line. Monthly technical meetings were organized to analyse critical problems to steer the development of new forensic methods. A large number of forensic methods that were developed in the 3rd line support were used by the CCUs as investigative methods. This was done on purpose to support the rapid development of the computer field. The 3rd line would deal with new technology while solutions of 'last years new technology' would go down to the next level in the pyramid. Besides technical meetings, the 2nd and 3rd line also have strategic meetings in which a long-term vision has been developed to influence political decisions about new developments. As the situation became accepted and some of the early problems were solved, the focus shifted from 3rd-2nd to 2nd-1st line of communication. As the use of Internet 'exploded' in the Netherlands starting in 1995 it became clear that the 2nd line would never be able to cover all computer-related crime. Hence, a program was set up to educate the 1st line in the pyramid to enable a further flow of new methods from the 2nd to the 1st line. This led to a strategic report called 'Digital Investigations' by the end of 1997. The organisation structure was accepted and other organisations joined the pyramid organisation, i.e. the investigative branch of the Internal Revenue Service joined the 2nd line and the National Division for Operational and Technical Support joined the 3rd line. The board of commissioners accepted the vision and at this moment several trainings have been set up to organize and educate the 1st line.

3.2.2 International harmonisation
Parallel to the national harmonisation both the NFI and the Dutch National Police Force, i.e. the NCID were participating in international developments. In 1993 the first meetings were held of the directors of the European Network of Forensic Science Institutes (ENFSI). It would take another four years before a special ENFSI computer working group was established in 1997 by France, the Czech Republic and the Netherlands. Invited by the FBI, the NCID in 1993 attended the first meeting of the International Organisation on Computer Evidence (IOCE). There, the IOCE had its beginnings when representatives from a dozen countries assembled at Quantico, Virginia, to discuss important issues related to computer crime. In 1995, the IOCE achieved official recognition as the result of the adoption of its bylaws at the second conference in Baltimore, Maryland.

The IOCE was established to provide law enforcement agencies with an international forum for exchange of information concerning computer crime investigation and related forensic issues. The IOCE objectives include the identification and discussion of issues of common interest; the dis-
Chapter III: Forensic Expertise and Criminal Procedure

Semination of beneficial information to investigators; and the making of recommendations for consideration by its members. The theme of the highly successful third conference in Melbourne, Australia, was *The World Wide Web of Crime: Who's Controlling the Traffic?* and represented the first attempt by the IOCE to deal with the burgeoning problem of crimes committed on the Internet. The most recent conference was held in The Hague, the Netherlands, in the fall of 1997. One of the highlights of that conference was a tour of the state-of-the-art in the Netherlands Forensic Institute in Rijswijk where the latest advances in computer forensics were demonstrated. A new board was also elected at that meeting and comprises a good cross-section of representatives from the United Kingdom (Forensic Sciences Service), Canada (Royal Canadian Mounted Police), the United States (FBI, president), and the Netherlands (NFI vice president and the NCID). The new board is committed to fostering co-operation between members and acting as an international voice for the computer forensics community. Membership in the IOCE has grown considerably in five years and now includes 45 agencies representing 25 countries.

At the same time, the NCID was involved in setting up co-operation with law enforcement agencies in other Interpol countries. This eventually led to the Interpol Working Group on Information Technology and Crime. In the beginning, collaboration between these agencies was generally aimed at joining forces against international hacking crimes. When hackers commit cyber crimes, i.e. Internet-related crimes, and are connected through two or more countries they can only be prosecuted when international collaboration is possible and evidence is exchanged (see also (9), (10), (11)). Many official meetings but also friendly meetings were organised between computer crime specialists of law enforcement agencies and defence organisations worldwide such as the famous Office of Special Investigations (OSI) of the US Air Force. Also in 1993 NATO's Allied Command Europe Counter Intelligence (ACE-CI) launched the unclassified Lathe Gambit Project to enable exchange of experience and skills between NATO allies to prepare for Information Warfare on what is now known as the fourth battle field. As could be expected: Information Warfare and Computer Crime are closely related and currently Lathe Gambit meetings are attended by both military and law enforcement organisations. With its yearly conferences, international trainings and additional frequent regional round table meetings, the Lathe Gambit Project should be considered as one of the most successful initiatives in the international exchange of information on computer crime of the 1990s.
4 Computer crime law

4.1 Challenges in the law
The modern developments in information technology (IT) have greatly influenced criminal law. With a view to the subject of this book, we will leave aside the consequences of IT for substantive criminal law (see for example new types of offences that were introduced in national legislation in order to criminalise the forms of computer crime mentioned in paragraph 2.). We will concentrate on the consequences for criminal procedure, especially methods of investigation and evidence gathering.

We distinguish three challenges of IT in criminal procedure: the challenge to traditional concepts, new investigative methods, and internationalisation.

4.1.1 The challenge to traditional concepts
The principal aim of criminal procedure can be described as gathering as much information as necessary in order to verify a suspicion of a criminal offence (in accordance with certain legal rules and principles). Traditionally criminal procedure has been oriented towards two sources of information: human beings (witnesses, police officers) and tangible objects (items bearing fingerprints, books, blood etc.). IT has added a third one: electronic data. With regard to data that is stored on external storage media like floppy disks, tapes or CDs, there are no special difficulties because, for procedural purposes, the data can be identified with the object carrying the data (the only problem is how to ‘read’ the data from the object). However, if data is stored and processed in large and open computer networks, the link with tangible objects gets very loose. The question arises whether data, as distinct from an object, can be made subject to actions under criminal procedure. For example, can one seize data without the object that it is stored upon (seizure of the object might be disproportionate or simply technically impossible (a complete network server)? Can traditional search powers be used in order to search data in computers? And, on what legal basis can the data be used in evidence?

IT and the existence of data independent of a human being or a tangible object challenge the concepts underlying traditional criminal procedure and traditional investigative powers. Another example is the distinction – underlying, albeit implicitly, criminal procedure – between existing, tangible objects on the one hand and telecommunications on the other hand. In IT terms this is the distinction between stored data and streaming data. Traditionally (tangible) objects and telecommunications are subject to different legal regimes. In order to gather evidence from objects powers of search and seizure can be used. Telecommunications, however, have to be intercepted. The main difference is that the interception of telecommunications is a covert investigative method (otherwise the stream of information would run dry), whereas search and seizure normally take place in the presence of witnesses or suspects. In modern IT, however, the distinction
between stored data and streaming data gets very blurred. In network technology a stream of data from A to B is a sequence of transport, (intermediate and temporary) storage, transport, storage, etc. In this situation, from a legal point of view it is not clear which power applies: the power of search and seize or the power of interception?

4.1.2 New investigative methods

IT also brings about new investigative methods or leads to a transformation of existing methods. An important example of the latter is the interception of telecommunications. From a legal point of view there seems to be no difference between the interception of phone calls to and from Mr. A and the interception of e-mail messages sent to and from A. Technically there is a big difference. A traditional wiretap on the Internet is not very useful because a message is split up into several parcels, which go along different routes to the destination, where they are assembled into a message again. A real ‘Internet tap’ requires special software installed upon the servers of Internet Service Providers. Thus the same power (interception) is applied in a completely different manner.

With regard to interception it should also be pointed out that in the European Union the market for telecommunications services has developed into a free, liberal market. Telephone companies used to be in the hands of the state – usually one in each country – but have now been replaced by private businesses. Moreover, there is a development towards differentiation in services, where the operation of the networks and the operation of telecommunications services (telephone, Internet) are in the hands of different companies. These developments in the telecommunications market have major implications for law enforcement. In order to carry out a normal wiretap these days the police have to deal with different companies (sometimes even with more companies at the same time (a network operator and a service provider). Not only does this cause all sorts of practical problems, it might also affect the quality of the evidence gathered by interception. The former telephone companies, being state companies, used to be very co-operative; like the police they worked in the general interest so that there was no doubt about their reliability. In the new situation the police are dependent on private parties, whose first concern is the interest of their clients. Especially if the number of telecommunications companies rises and quality standards diverge, the reliability of the evidence that is gathered through their help might not be self-evident any more.

Besides the transformation of existing investigative methods like the interception of telecommunications, IT also brings about new methods with new chances for investigation. For example, it is possible to record the words and messages that someone types on a keyboard by placing a bug on the keyboard. The same result can be obtained by (secretly) installing spe-
cial software on the computer of the person being investigated. The advantage of this method of gathering data 'at the source' is that the data is obtained before encryption programs can encode it. How should this method be classified? Interception? This is doubtful because data are gathered even in situations where there is no communication between A and B. New regulation is required in this matter in order to guide the police in exploring new technical possibilities and to provide legal safeguards for persons subject to those methods.

IT also opens up new sources of information for the police. Large databases (with all sorts of information about individuals) are now easily accessible, in contrast with the past. And they can be matched on specific criteria very quickly. This is the so-called data mining or Rasterfahndung. Even if it is applied to public databases (like population registers or the registers of chambers of commerce), this method can produce information which has never been available to the police in the past. However, from the point of view of the protection of privacy, data mining raises difficult questions (e.g. can it be used indiscriminately with regard to suspects and non-suspects?).

4.1.3 Internationalisation
Perhaps the most important challenge of modern IT in criminal procedure is internationalisation. Of course this is not a new phenomenon. Criminals have always tried to extend their 'business' across borders. In most western countries international organised crime is a priority of criminal policy and leads to new forms of co-operation. IT, however, adds a new dimension to internationalisation: in IT borders simply do not exist any more. Where in traditional crime (or crime committed with traditional methods) persons, goods and actions are almost naturally bound to a place and a jurisdiction, in computer crime the allocation of 'things' to national jurisdictions can be problematic. Persons can sit behind a computer in country A and at the same time commit a crime (e.g. the distribution of child pornography) in country B. As far as criminal procedure is concerned, the question arises whether the authorities of A or B or both (to a certain extent), are competent to investigate the matter.

The jurisdiction problem is even more problematic because of the speed with which things take place in IT. Computer data are volatile. This means that in an IT environment the police have to act very quickly in order to secure evidence. Traditional arrangements of international criminal co-operation will often be just too slow to investigate crimes through international computer networks.
4.2 Legal developments
Prompted by the challenges in the law mentioned above it is interesting to take a better look at the legal developments in the Netherlands and related international developments.

4.2.1 National developments in the Netherlands
The rise of the computer has not left Dutch criminal law untouched. In 1993 the Computer Crime Act introduced major changes to both the Criminal Code and the Code of Criminal Procedure. Among other things, specific computer crimes, like hacking (Article 138a Criminal Code), were introduced.

One of the basic assumptions of the Computer Crime Act was that where the law uses the term 'goods', this does not extend to data processed by computers. The Government expressly stated that the principle of legality in criminal law required a strict interpretation of the term, which, according to the Government, only covered objects with an independent, physical existence. This assumption has important implications. It means for example that the law of theft and the law of criminal damage cannot be applied to situations where someone 'steals' or destroys computer data (without the consent of the 'owner'). Therefore the legislator had to introduce specific offences, for example criminal damage with regard to data (knowingly and unlawfully changing, deleting and making inaccessible of computer data (article 350a Criminal Code). The assumption that computer data are not covered by the term 'goods' has also had implications for criminal procedure. The Computer Crime Act for example introduced a separate power for the investigating magistrate to demand that any person who has access to data stored in a computer, shall deliver – or disclose, if necessary, through telecommunications – these data to the magistrate (Article 125i Code of Criminal Procedure). This is a counterpart of the power to demand that (physical) objects shall be delivered, which already existed long before the Computer Crime Act. These examples show how a traditional concept ('goods') turns out to be unsuitable to meet the challenges of new developments in IT, so that a new concept ('computer data') has to be introduced (see par. 4.1.1).

The Computer Crime Act has maintained the distinction between stored data and streaming data, this distinction being reflected by the existence of two separate sections of the Code of Criminal Procedure, one on interception of telecommunications and one on the examination of data stored in computers. The latter section links up with the law on search and seizure. It is based upon the assumption that the power of search and sei-
zure of (tangible) objects implies the power to examine the object as a whole and to gather all the information (data) stored on or in the object. This means that during a search the police are empowered to sit behind the computers at the place of the search to find out what data are stored in them. In this respect computer data stored upon a hard disk do not differ from a fingerprint on a glass. Starting from this assumption Article 125 contains some additions to the law on search and seizure, among other things:

- Article 125j Code of Criminal Procedure provides for the so-called network search: during a search the investigating authorities are allowed to search in computers elsewhere which are connected to the computer at the place of the search. The network search shall only extend to the connected computers as far as persons who work or live at the place of the search have lawful access to those computers. The network search, like a normal search, is restricted to the examination of data stored in the network computers and shall not be used to intercept data communications through networks.\(^4\)

- Article 125k Code of Criminal Procedure provides for the power of the searching authorities to demand access to computers that are protected by, for example, a password and to demand that data that are encrypted be decrypted. Such an order can be addressed to anyone who can reasonably be expected to have the necessary knowledge, like the network manager. However, the order cannot be addressed to the suspect because of the privilege against self-incrimination. Being restricted to stored computer data Article 125k does not imply the power to demand that intercepted telecommunications be decrypted.

- Article 125i, mentioned above: the investigating magistrate may demand that certain data stored upon computers be delivered to the Court in order to avoid a search.

The Computer Crime Act has not changed the Dutch law of evidence. There was no need for this because the law of evidence is rather flexible. It provides for some broad categories of evidence, like the official report of a police officer containing his observations, and the personal observations by the Court. Furthermore, what is decisive is the conviction of the Court whether or not the case is proven. Because of this, computer evidence (printouts of intercepted e-mails, data gathered in computers and stored on tape or floppy disk) does not cause any special difficulties.

The concepts and provisions introduced by the Computer Crime Act have proven quite adequate as a basis for the investigation and punishment of

\(^4\) Investigating authorities may of course not extend their powers beyond their competence: therefore they cannot search data stored upon computers under a foreign jurisdiction.
Chapter III: Forensic Expertise and Criminal Procedure

Offences involving modern IT. Nevertheless, after this Act the rise of computer networks, especially the Internet, has raised new questions with regard to criminal procedure (see par. 4.1 above). Recently a new Bill (Computer Crime II) has been introduced into Parliament. The Bill is largely aimed at clarification of the provisions of the first Computer Crime Act. Again, the Bill maintains – even sharpens – the distinction between interception of telecommunications and examination of stored data. Furthermore, it provides for a new power to make certain computer data (like racist material, child pornography, computer viruses) 'inaccessible'. Until now the police have only had the power to search for data and copy them for evidential purposes. They are not allowed to 'seize' them in the sense that they may remove the data from the control of the operator of the computer (e.g. by deleting them), like they do when they seize objects. Finally, the Bill on Computer Crime II extends the protection that mail enjoys under substantive and procedural law, to electronic mail. This means among other things that if the police want to examine the computers of Internet Service Providers, some special requirements must be met.

Finally, the new Telecommunications Act ought to be mentioned, which came into force on 15 December 1998. This Act provides a legal framework for the European liberalisation of the telecommunications market mentioned in paragraph 4.1.2. It contains a broad definition of telecommunications networks and services, which covers both traditional telephone companies and, for example, Internet Service Providers. An important element of the new law is the obligation of all network and service providers to make their networks or services fit for interception by the law enforcement authorities and to co-operate with the latter in executing an interception order. The Government argued that this obligation was of the utmost importance. The Government feared that if the operator of any type of telecommunications network or service were not obliged to make it fit for interception, this would provide an avenue of escape for criminals. Critics of this law protested that this obligation put a disproportionately large administrative and financial burden upon telecommunications providers. According to them, the law enforcement authorities would always lag behind the technological developments and would never be able to intercept all telecommunications of (suspected) criminals. For the time being Parliament was convinced of the need for the authorities to be able to intercept on any type of telecommunications system.

4.2.2 International developments
In the field of criminal law international developments tend to be slower than developments at the national level. This is also the case with regard to the consequences of modern IT for criminal procedure. For instance there is no binding legal instrument yet which requires states to introduce in

their national law certain computer crimes or specific provisions with regard to mutual legal assistance in investigations in computer systems. There is a treaty in preparation to deal with such matters; we will come back to that further on.

However, there is an international document that, although it does not have the binding force of a treaty, is an important statement of generally recognized principles in the field under consideration. It is Recommendation No R (95) 13 of the Committee of Ministers of the Council of Europe concerning problems of criminal procedural law connected with information technology. This recommendation was adopted on September 11, 1995. The document urges the governments of Member States, when reviewing their internal legislation and practice, to be guided by certain principles appended to the recommendation. We will give a brief overview of the most important principles. It will become clear that many of the above mentioned challenges and problems of IT for criminal procedure are reflected in the principles of Recommendation No R (95) 13 and that the responses of Dutch law are inspired by the Recommendation.

- Criminal procedural laws should permit investigating authorities to search computer systems and seize data under conditions similar to those under traditional powers of search and seizure (principle I.2). In this respect states are advised to make a clear distinction between searching computer systems and seizing data stored therein and intercepting data in the course of transmission. See chapter I of the Recommendation, entitled Search and Seizure. As we have seen earlier, this distinction plays an important role in Dutch criminal procedure.

- In view of the convergence of information technology and telecommunications, laws pertaining to technical surveillance for the purposes of criminal investigations, such as interception of telecommunications, should be reviewed and amended, where necessary, to ensure their applicability (principle II.5). According to this principle, states should, for example, enable the interception of e-mail. As far as the Netherlands is concerned, the recent Telecommunications Act meets this requirement.

- The law should recognize the need for specific obligations of private persons to co-operate with the investigating authorities, for example, the obligation of persons who have computer data under their control to provide all necessary information to enable access to a computer system and the data therein (principle III.10). Furthermore operators offering public telecommunications services should avail themselves of all necessary technical measures that enable the interception of telecommunications (III.11).

- Special procedures and technical methods for handling electronic evidence should be developed which ensure and reflect the integrity and authenticity of the evidence. Legal provisions on evidence relating to traditional (paper)
documents should similarly apply to electronic documents (principle IV.13). The Explanatory Memorandum to the Recommendation explains the difficulties of electronic evidence as opposed to paper documents (par. 152ff of the Explanatory Memorandum): among other things electronic documents can only be read by means of special hard and software and they can be easily manipulated in such a way that the manipulation is not detectable by the eye. The Explanatory Memorandum suggests different procedures for authentication of electronic evidence, like the establishment of a complete chain of custody (from the person who first copied the data to the person who produced the printout for trial) or the use of electronic signatures (par. 161). The development of a harmonised approach in this matter at an international level is indispensable because of the cross-border nature that IT offences often have (par. 164). Otherwise, according to the Explanatory Memorandum, serious problems regarding the admissibility of electronic evidence will continue to exist.

Until now the need for a harmonised approach at an international level, as recognized in the last principle, has not led to any real harmonisation of criminal procedure (neither with regard to evidence nor otherwise). One interesting exception should be mentioned. On 17 January 1995 the Council of the European Union adopted a Resolution on the lawful interception of telecommunications (96/C 329/01).7 In this document the Member States of the EU have formulated a series of requirements in order to enable the law enforcement agencies to realise the lawful interception of telecommunications (therefore the resolution is also called the User requirements). The requirements are mainly directed at network operators and service providers. The first requirement is an expression of the basic principle, which we also came across in connection with the Dutch Telecommunications Act. It reads: "Law enforcement agencies require access to the entire telecommunications transmitted, or caused to be transmitted, to and from the number or other identifier of the target service used by the interception subject". In other words: law enforcement agencies should have lawful access to all telecommunications. Then requirements follow with regard to the availability of so-called traffic data, the way the providers should deliver the intercepted communications, the decoding of encryption used by the providers, the confidentiality of the interception, etc. The User requirements resolution is a document under the so-called third pillar of the European Union, which deals with public order and criminal justice. The resolution does not have the legally binding force of a regulation or a directive of the EU. It is a declaration of intent of the Member States stating that with regard to the lawful interception of telecommunications they shall take account of the User requirements. Any binding force for telecommunications providers can only be based on the national


252
law providing for interception. Apart from this, the telecommunications industry seems to have accepted the User requirements after having been consulted in the preparatory stage about the content and formulation of the requirements. Here the need for a harmonised approach is clear: in an international market (big) private businesses are only prepared to accept national requirements with regard to law enforcement if they do not vary in every country and they do not hinder international trade. The Member States of the EU intend to review the User requirements continuously and adapt them to new developments in telecommunications (like Internet).

Another international document, which ought to be mentioned, is the Organisation for Economic Co-operation and Development's Guidelines for cryptography policy. These Guidelines are intended to promote the use of cryptography – as an important tool for fostering confidence in information and communications systems, for ensuring the security of data and for protecting privacy – through coherent national and international policies. Keywords are international co-ordination and co-operation between public and private sectors. Principle No. 6 states: "National cryptography policies may allow lawful access to plaintext, or cryptographic keys, of encrypted data". Although the Guidelines leave governments a wide discretion in this matter, they urge them to carefully weigh the benefits of any such policy as well as the risks of misuse and the costs of any supporting infrastructure etc. This admonition reflects the difficulties that policy- and lawmakers face in trying to find solutions for the difficulties that cryptography causes law enforcement.

Finally, the Council of Europe has taken the initiative to create a binding legal instrument with regard to the consequences of modern IT for criminal law and criminal procedure. On 4 February 1997 a Committee of Experts on Crime in Cyber-space (PC-CY) was set up in order to draft a convention covering such topics as offences committed through telecommunications networks, responsibility of Internet Service Providers, cross-border use of investigative powers and questions of jurisdiction and international co-operation. Notwithstanding the fact that the Council of Europe is a regional body, the proposed convention might in effect provide for a global framework for law enforcement in 'Cyber-space', because Canada and the United States among others are actively involved in the preparation of this convention as observers for the Council of Europe. The Committee should finish its work by the end of 2000.

---


9 See for the terms of reference of this committee: http://www.coe.fr/corruption/epccy.htm.
Chapter III: Forensic Expertise and Criminal Procedure

5 Evaluation

We have shown that modern developments in IT present several challenges to criminal procedure. It turns out that traditional concepts and investigative powers, like the concept of 'goods' or the power of search and seizure, are not (fully) compatible with modern developments in IT. In Dutch criminal procedure this has led to the introduction of separate provisions and new concepts (e.g. 'computer data'), often by analogy with existing laws with regard to traditional offences and investigative powers. This approach involves a risk. IT is — still — developing so quickly that the law may rapidly become outdated. In order to counteract this risk there is a tendency in legislation (not only with regard to IT) to use broad concepts and definitions, which cover a range of (similar) situations. An interesting example of the latter is the power of 'interception of telecommunications'. Since the new Dutch Telecommunications Act the term 'telecommunications' covers all sorts of telecommunications, regardless of technical divergences. This means that the Dutch law enforcement authorities are now entitled to intercept any type of telecommunications and that providers of telecommunications networks and services — from ordinary telephone companies to Internet Service Providers — are all required to make their systems fit for interception. In the Netherlands this type of legislation is commonly called 'technology independent' or 'technology neutral'. Inevitable though it is, this approach of the legislator has one important drawback: it may lead to the use of rather general and abstract terms, which might not be fully compatible with the principle of legality.

National legislators — not to mention international lawmaking bodies — are faced with a difficult task. As we have seen in this article the lawyers lag behind the 'technicians'. The forensic analysis of computer evidence has already become a grown-up branch of forensic science. Forensic science institutes and specialised police agencies have set up national and international networks in order to exchange information and work together and further develop their skills and methods. This automatically leads to a certain harmonisation of forensic computer science at an international level, irrespective of differences in national legal systems. These legal differences, however, are not meaningless. On the contrary, in the field of computer(-related) crime, which is truly international by nature, differences in national legal systems will inevitably form a major obstacle for the necessary international approach and co-operation. In effect it seems that the problems caused by IT can only be solved on an international level. Nevertheless, as we mentioned above, we find that national legislators lag behind the forensic scientists and that international law makers lag behind the national legislators.

One may regret this. As long as the law is not adapted to the new situation forensic scientists and the police will face difficulties in finding evidence
and proving a case in a lawful way. Further, with regard to the lack of international co-ordination and harmonisation, it may be very inefficient if every state reinvents the wheel in a new field of law. If, at last, there is an international solution, states may have to change their laws again. Therefore ideally one might wish that in the field of IT and criminal law international (lawmaking) bodies take the lead and give guidance to both the national legislators and the practitioners (forensic scientists and the police). However, in our opinion this is an illusion. It is likely that some 'experimenting' – by practitioners and national legislators – is necessary before a well-considered and long-lasting international solution can be found, especially in a field like IT which is still moving fast and in directions which are not yet set.

References


6 How Psychologists Should Help Courts

Peter J. van Koppen

1 Two prostitutes and their pimp

In a recent case in the Netherlands a pimp was accused of battering two of his prostitutes and raping one of them. Although the police knew of the pimp’s violent character, the case presented them with a problem: the prostitutes had also accused the pimp of forcing them to sell their bodies, yet both continued to work in their trade after the pimp was arrested. Were they just making their whole story up or was this characteristic of prostitutes, even battered prostitutes? To answer these questions, the police called in a psychologist the day before the case served in the district court.

The prosecution chose this psychologist because she had done some research on prostitutes. She read the police record of the statements made by the prostitutes, and spoke to each of them for an hour. The following day she testified in court upon the results of her short investigation. First, she said that the girls demonstrated a pattern of behavior familiar from her studies of prostitute behaviour: “The story they told tallied with the behaviour of pimps I have encountered before. [...] I was not surprised by what I heard and read.’ Second, she told the Court that the girls were speaking the truth: “They were not hesitant and were strikingly consistent during our conversation. In addition, their statements were nearly synonymous. [...] I have encountered very few deceitful statements in my research on prostitutes. [...] nor did I get the impression that the things that happened were exaggerated. [...] Their consistency leads me to conclude that what the young ladies have told is true”.

Statements like the one made by this psychologist are quite common in the Dutch legal system, yet, they are wrong by any standard, legal or psychological. I will return to this later.

In the Netherlands psychologists are routinely called upon – by the investigative judge, prosecution, defence, or court – to testify about a number of subjects. The most common is testimony concerning the sanity of the accused during the course of the crime, a task usually performed by clinical psychologists most of whom are employed by government agencies. I leave that subject to another chapter in this book. The present chapter deals with psychologists who testify on subject matter that is re-

1 These and all following quotes are translated from Dutch.
lated to assessing the quality of evidence presented to the Court. This kind of testimony almost always concerns the usefulness of witness statements and to a lesser extent statements made by the suspect. In this chapter I focus on the standards that have been or should be set for psychological expert testimony. I use Dutch examples for demonstration purposes.

2 The Dutch standards for expert witnesses

Only very recently, the Dutch Supreme Court set standards for the testimony of expert witnesses. Under Dutch law this is quite novel, since the decisions about the facts are left almost completely to the inferior - district and appellate - courts. In 1989 the Supreme Court ruled in a case in which an expert witness used anatomically correct dolls to assess the veracity of a statement made by a minor in a sexual abuse case. The Court decided that if the defence seriously contests the method used by the expert, the Court should clearly explain why it chooses to admit the expert's opinion as evidence all the same. At the beginning of 1998 the Dutch Supreme Court expanded this decision by reversing an appellate court decision in a case in which an orthopaedic shoemaker had given an expert opinion on shoeprints. The Supreme Court ruled that since the accused challenged the qualifications of the expert, the appellate court should have investigated (1) whether the expert was also an expert on shoeprints; (2) if so, what methods he used to reach his opinion; (3) why he considered this method reliable enough; and (4) to what extent the expert was able to use this method competently. These guidelines may seem meagre to the Anglo-American-Saxon lawyer; they are profoundly new to Dutch criminal procedure. Using the rules set by the Dutch Supreme Court I will assess the testimony of psychologists in court. I will also show how poor the Dutch standards are and conclude by giving an extended list of standards for expert witnesses.

3 Psychologists versus forensic psychologists

A large part of the work of psychologists consists of making predictions. We call something a prediction if we make a statement about something we cannot observe based on what we can observe. For instance, psychologists estimate an individual's intelligence based upon his score on a ques-
tionnaire. Prediction can be about the future (how dangerous an offender may become in the future), the present or the past.
The quality of a prediction depends mainly on the quality of the instrument used to make the prediction. For instance, we know that predictions on intelligence based upon a proper intelligence test outperform the clinical judgement of a psychologist.\(^5\)

Predictions in one context differ from predictions in other contexts. Predictions made in a therapeutic setting – usually referred to as diagnosis – are quite different from predictions made in a forensic setting. In therapy the diagnosis resembles the diagnosis a general practitioner makes. If I go to my general practitioner with a stomach ache, he can probably not make a straightforward diagnosis because this is a notoriously difficult symptom. The doctor then does two things: he tries to eliminate the most dangerous possibilities, like acute appendicitis, and once these have been ruled out, he gives you a medicine and asks you to come back next week. This manner of making a diagnosis is typical for physicians and therapists. It is vital not to miss anything that might be acutely dangerous, but other than that the diagnosis only has temporal value; if the medicine he gives me today does not help, he can give me another one next week.

<table>
<thead>
<tr>
<th>True disease of patient</th>
<th>Appendicitis</th>
<th>Something else</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendicitis</td>
<td>Correct</td>
<td>False negative</td>
</tr>
<tr>
<td>something else</td>
<td>False positive</td>
<td>Correct</td>
</tr>
</tbody>
</table>

The structure of the problems associated with the medical diagnosis is illustrated by Table 1. The most important aim of the diagnosis is to not miss appendicitis, that is to not make a false negative diagnosis. Avoiding false negatives is considered to be in the best interest of the patient. In the same vein the diagnosis of a psychologist in his role of therapist is temporary, and aimed at avoiding false negatives.

In the forensic setting the role of prediction is quite different.\(^6\) If the psychologist writes a report for the Court, the ‘diagnosis’ is final from the perspective of the psychologist. Once the report has been submitted to the Court, it may play a role in the Court’s decision. The psychologist is given no further opportunity to adapt the conclusions to new insights in the case. More importantly, the psychologist is there to aid the Court’s decision, not

---

5 See e.g. P.E. Meehl, *Clinical versus statistical prediction: A theoretical analysis and a review of the evidence*, Minneapolis: University of Minnesota Press 1954.

to help witnesses or suspects. Since the work of the psychologist is aimed at aiding the Court, it should depart from the point of view of the Court. This view is governed by doctrine and precedents, including the principles that the suspect is to be considered innocent until proven guilty and that it is better to free twenty guilty suspects than convict one innocent individual. The criminal justice system, then, is aimed at avoiding false positives rather than false negative predictions (see Table 2). If a psychologist wants to serve the Court while evaluating the statement of a witness who accuses the suspect, the psychologist should also try to avoid false positives (see Table 3).

Table 2  The structure of the decision by the Court

<table>
<thead>
<tr>
<th>True state of affairs</th>
<th>Suspect is guilty</th>
<th>Suspect is not guilty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspect is guilty</td>
<td>Correct</td>
<td>False negative</td>
</tr>
<tr>
<td>Suspect is not guilty</td>
<td>False positive</td>
<td>Correct</td>
</tr>
</tbody>
</table>

Table 3  The structure of the diagnosis of the forensic psychologist

<table>
<thead>
<tr>
<th>True state of affairs</th>
<th>Witness speaks the truth</th>
<th>Witness does not speak the truth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Witness speaks the truth</td>
<td>Correct</td>
<td>False negative</td>
</tr>
<tr>
<td>Witness does not speak the truth</td>
<td>False positive</td>
<td>Correct</td>
</tr>
</tbody>
</table>

This difference between predictions in the therapeutic context and the forensic context becomes problematical if psychologists serve as expert witnesses while they do not understand this crucial difference. Most psychologists are used to the clinical setting where the perception of the client is central to the interaction between psychologist and client, and the truth of the client's statements of minor importance. A therapist who is very interested in what really happened to his client may hurt their relationship which is based on trust, and impair the therapeutic process; for the forensic psychologist the only point of interest is what really happened. Also, the therapist is trained to show empathy with his client. If a therapist is hired

How Psychologists Should Help Courts – Peter van Koppen

to evaluate a statement made by a witness for the Court, empathy with the witness is incompatible with the independent role the expert has to play. ⁹

In addition the diagnosis of the forensic expert needs to meet much higher standards than the diagnosis of the therapist. In a therapeutic setting each diagnosis is temporary and if during consecutive sessions the diagnosis proves to be wrong, it can be changed without any harm being done. In criminal cases in the Netherlands psychologists are usually only called in if there is a problem with the evidence. In most cases this means that there is little evidence other than the witness statements which are subjected to then laid before the expert psychologist for an opinion. In such cases the expert testimony may mean the difference between conviction and acquittal. For this reason the expert opinion should meet much higher standards than the diagnosis of the therapist. If, for instance, a psychologist comes to the conclusion that a witness is speaking the truth, he must be pretty sure of this. ¹⁰

4 The expertise of the psychologist

Let us return to the Supreme Court decision in the shoemaker case and compare it to the opinion given by the psychologist in the case of the prostitute mentioned earlier. The psychologist gave evidence on two questions: is the behaviour of the prostitutes typical for battered prostitutes and do they speak the truth?

The first criterion set by the Supreme Court is that the expert must have expertise in the field concerned. The psychologist has done research on prostitutes. This means that she must have expertise on the type of behaviour displayed by battered prostitutes in different kinds of situations. But that was not the question asked by the Court; rather, the Court wanted to know whether displaying certain behaviour indicates that the prostitutes have been battered. That question is considerably different from the research done by the psychologist. This is a common error made by psychologists, in other cases as well. Sexually abused children, for instance, tend to have behavioural problems, start wetting their bed again, and often have nightmares. But how diagnostic of child sexual abuse is wetting the bed at a later age?

A somewhat less obvious version of this error also occurs in sexual abuse cases, as the following example illustrates. A nineteen-year-old girl – I will call her Linda – accuses a much older man of sexually abusing her for some years. The suspect admits their sexual relationship, but claims it has been of a much shorter duration and, more importantly, that it was a consensual relationship. A clinical psychologist is called in to study the file

and talk to the girl. After making several other errors in her report – which I will not discuss here – she concludes that Linda is speaking the truth because she is suffering from posttraumatic stress disorder. This diagnosis is derived from the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV), a publication of the American Psychiatric Association which is used worldwide for the classification of psychiatric disorders.\(^{11}\) The DSM-IV also lists a large number of criteria all of which have to be met before a patient can be diagnosed as suffering from posttraumatic stress disorder.\(^{12}\) As is typical in the therapeutic setting, the psychologist diagnoses Linda loosely as suffering from this disorder, without making clear to the Court the bases for her diagnosis. A much larger problem, however, is the fact that the psychologist argues that *because* Linda is suffering from posttraumatic stress disorder, it is very likely that she suffered from the sexual trauma inflicted upon her by the suspect. How does the psychologist know? The first criterion in the DSM-IV for posttraumatic stress disorder is: "The person has been exposed to a traumatic event in which both of the following were present: (1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others; (2) the person's response involved intense fear, helplessness, or horror."\(^{13}\) How does the psychologist know that Linda suffered a trauma? Simply, because Linda told her. This is an acceptable basis for making this diagnosis in a therapeutic setting, but if the psychologist then uses the diagnosis to convince the Court that Linda was sexually abused, the reasoning has become completely circular. This kind of expert opinion is particularly dangerous. Because psychologists never tell the Court how they reached their diagnosis, the circularity of the testimony remains completely hidden from the Court.\(^{14}\)

The psychologist in the case of the prostitutes also gave an opinion on the veracity of the stories told by the two girls. Asked in court what she knew about CBCA,\(^{15}\) she answered: "This abbreviation means nothing to me". Since CBCA is the method most frequently used for evaluating the veracity of witness statements,\(^{16}\) the psychologist clearly is no expert on the credibility of witness statements. We only know that because the defence asked her. Dutch courts almost never start questioning the expert with the

---

12 Ibid., pp. 427–429.
13 Ibid., p. 427.
14 Even for the Dutch Supreme Court. See HR 18 November 1995, NJ 1996, p. 666, in which the court accepted such an expert statement as valid evidence.
15 Abbreviation of Criteria-Based Content Analysis, discussed below.
simple request: “Please start by telling us why you think you are an expert”.

5 Methods for evaluating witness statements

The second, third, and fourth criteria set by the Supreme Court in the shoeprint decision are related: all concern the method used by the expert. The method should be explained, should be reliable\(^{17}\) enough to warrant the conclusions given, and the expert must be able to use this method competently. The most common methods for evaluating witness statements are lie detection, which is not used in the Netherlands,\(^{18}\) and Statement Validity Analysis (SVA).\(^{19}\) SVA aims to assess the truthfulness of a witness statement by two methods: Criteria-Based Content Analysis (CBCA)\(^{20}\) to evaluate an interview with the alleged victim and the Validity Checklist (VCL) to evaluate other information. Evaluations by psychologists using SVA or CBCA alone are done on a rather large scale in the Netherlands. I will first discuss the CBCA and then turn to the VCL.

5.1 Criteria-Based Content Analysis

The CBCA is based on the assumption that a true statement can be distinguished from a false statement because someone who tells about something that really happened tells another story than someone telling about something that did not happen. The method was expressly developed for children who were allegedly victims in sexual abuse cases, but nowadays is also used for the evaluation of alleged adult victims.\(^{21}\)

In applying CBCA it is of major importance that others have exerted as little influence as possible on the statement. In addition, the interview itself must comply with high standards (and avoid asking leading questions in particular). For this reason, the witness should be interrupted as little as possible and should tell the story as far as possible in free recall. This method of questioning is essential to the CBCA.\(^{22}\) The interview must then

\(^{17}\) Dutch lawyers commonly say 'reliable' when they mean the validity of a method.


\(^{22}\) See e.g. U. Undeutsch, 'Statement reality analysis', in A. Trankell (red), Reconstructing the past: The role of psychologists in criminal trials, Deventer: Kluwer 1983, pp. 27-56.
be typed out verbatim and the criteria of the CBCA applied to the written version of the interview. The most important reason for this is the absence of a fixed scoring scheme for the CBCA. The method fully depends on the detailed and argued analysis of the statements, using 19 criteria.23

The research on CBCA has had mixed results until now.24 The gist of the argument is that CBCA has some scientific potential but has too low a diagnostic value to be used in a forensic setting. Ruby and Brigham summarise the state of affairs as follows:

"The CBCA may have the potential to enhance the objectivity of the investigation and prosecution of allegations of child sexual abuse. It might also aid in protecting those who are unfortunate enough to be at the receiving end of an unfounded child sexual abuse allegation. But much more empirical validation work is necessary before it can adequately fulfill such a role."25

Yet, psychologists present results of their CBCA analyses without any hesitation to the courts and without mentioning the discussion on the instrument in the scientific community.

6 Validity check list

Some argue that CBCA is only valid enough if it is supplemented with the VCL. Raskin and Esplin are of the opinion that useful statement assessment should be more than just scoring a statement of the 19 CBCA criteria.26 The CBCA should be applied to material drawn from a properly conducted interview in which is gathered enough material to allow use of the criteria. In addition information must be gathered outside the interview. Since children differ in cognitive abilities and these differences influence the scoring of the criteria, information about these abilities and other personality characteristics of the interviewee is also needed. Alternative hypotheses on the genesis of the story as told by the child must be investigated as well. The story may be an error because of earlier suggestive interviews by parents or

others, because of deficient memory of the child, or because of other pressures on the child. The VCL has been developed for evaluating the latter elements. The VCL consists of four clusters:

a. psychological characteristics of the child;
b. interview characteristics of the child and the examiner;
c. motivational factors relevant to the child and others involved in the allegations; and
d. investigative questions regarding the consistency and realism of the entire body of data.

Research on the validity and usefulness of the VCL is very scarce and is limited to casuistic illustrations. Consequently, it is not clear what role to assign to the psychological characteristics or motivational factors of the child in evaluating the veracity of the statements made.

Using the VCL introduces another problem in expert opinions because it is at odds with the role assigned to expert witnesses in court in the Netherlands. The expert's role is limited to informing the Court about subjects which are not part of the common domain of knowledge of members of the judiciary and which can be discussed using knowledge common to the scientific domain. As soon as the psychologist's opinion is not based on psychological scientific insights or enters into the domain of the judge, he should keep quiet. In using the VCL both happen.

The VCL is neither based on sound empirical research nor limited to psychological insights. Especially Cluster D can pose problems. Take a case in which the psychologist interviews a child that is allegedly victim of sexual abuse. After the CBCA analysis, the psychologist considers the child’s story to be rather trustworthy and then dives into the case file to answer Cluster D of the VCL. There the psychologist finds additional clues for the veracity of the child’s story and concludes that the child is speaking the truth. In this case, the Court might decide that the child’s statement is supported by the expert’s opinion and the clues in the case file constitute sufficient evidence for a conviction. In doing so, the Court in fact, through the use of the VCL by the psychologist, makes ‘double’ use of the evidence present in the case file. This is a very real danger because in the absence of a clear-cut scoring scheme for the CBCA and the VCL psychologists tend to remain too vague to allow a thorough analysis of their statements and judges tend to limit their reading to the conclusions of the experts’ reports.

In addition, the VCL requires the psychologist to step outside his domain. In one report in a sexual abuse case, for instance, the psychologist in answering Cluster A of the VCL argued that the child’s story was supported

by the fact that around the time the alleged abuse supposedly started, she suffered from hyperventilation. I have been unable to find research supporting a relationship between hyperventilation and sexual abuse in either the psychological or medical literature.

6.1 Methods of own design
Although the VCL and more especially the CBCA are the methods most frequently used by psychologists for evaluation of witness statements, some have methods of their own. I already discussed the psychologist in the case of the prostitutes, who considered telling a story without hesitation, telling it each time in the same manner, and her own impression sufficient to support the conclusion that the witnesses were telling the truth.

Another example is the case in which a father is accused of, among others things, raping his daughter several times over a period of four years. A psychologist talks with the daughter, whom I will call Janet. The psychologist concludes:

"From a behavioural scientific point of view, the following conclusions can be drawn. Based on the results and analyses above, Janet's statement concerning the sexual abuse by her father must be qualified as believable."

This psychologist's analysis can be summarised as follows. This list is remarkable because this particular psychologist commonly uses CBCA to evaluate children's statements. The cited conclusion was based on the following:

1. Janet shows symptoms that indicate posttraumatic stress disorder.
2. Janet's mother reports that she observed a change in her daughter's development.
3. Janet suffered from medical problems, i.e. neck trouble.
4. The psychologist observed that Janet's story sounded plausible.
5. Janet recounts her story in the form of a script.
6. There is only a short period of time between discovery of the abuse and reporting to the police.
7. The statements made by Janet about her abuse could damage the relationship with her boyfriend.
8. Janet ran away from home.
9. Janet accused nobody but her father of sexually abusing her.
10. Janet has disclosed the abuse more implicitly than explicitly.
11. Janet reports that at first she "felt good" about her father touching her (in a false statement whereas the psychologist would expect the alleged victim to be completely negative about her father).
12. There is no evident motive for filing a false complaint.
The use of Criterion 1 by this psychologist has been discussed above. In using Criterion 2, this psychologist falls prey to the error I already discussed. Criteria 3, 7, and 12 fall outside the domain of psychology. Criterion 4, of course, is fully circular: the statement is true because the psychologist thinks it is true. Telling a story in the form of a script, Criterion 5, seems to be more indicative of an untrue than a true story. As for Criteria 6, 8, 9, and 10: these are more in the domain of the Court, since there is no research to support these criteria. With Criterion 11 this psychologist finally uses one, but only one, of the CBCA criteria.

I wrote a report of the request of the defence pointing out the problems with the criteria used by this psychologist. In a rebuttal the psychologist explains our disagreement by adding that experimental psychology and clinical psychology have their own philosophies, methods and techniques, so that results from experimental psychology are not valid.

7 Experts and counter experts

Assessing the validity of witness statements by a psychologist is almost the only field in which psychologists in the Netherlands report at the request of the public prosecution. In most other cases psychologists are called in by the defence to investigate methods used by the police in interviewing witnesses and suspects and, notably, in eyewitness identification of the suspect.

8 Interviewing witnesses

Most of what there is to say about psychological expert testimony about interviewing witnesses has been said above. Nearly all of these expert opinions relate to cases of child sexual abuse. In the last few years a new category of cases has been added: 'repressed memory' cases in which adult females claim that they repressed any recollection of past sexual abuse and only recently recovered the repressed memory of the abuse. Both the

30 There are some exceptions. One example, from my own experience, is the case in which a man spontaneously went to the police to confess to a murder of a young woman and during the interrogation confessed to three more. The examining magistrate was worried that the confessions might be false, so he asked me to at least assess the quality of the police interview, using the videotapes. I could reassure him: the interrogations were quite sound.
31 There is one other terrain which I will leave out of the discussion here, namely expert testimony on the scent line-up performed by tracker dogs. It is an interesting area, since most of the principles which apply in identification procedures apply to the scent line-up as well. See P.J. van Koppen (1995) Sniffing experts: Theory and practise of scent line-ups, *Expert Evidence*, 3, pp. 103-108.
32 This has led to a great controversy, the 'Memory Wars', both in the Netherlands and elsewhere. See J.D. Read and D.S. Lindsay (ed), *Recollections of trauma: Scientific evidence and clinical practice*, New York: Plenum 1997, especially E.F. Loftus, 'Dispatch
number of repressed memory cases — allowing for the size of the population — and the type of cases are the same in the Netherlands, the United States and Great Britain.\(^3^3\) In the repressed memory cases the same thing happens as in other sexual abuse cases: psychologists are called in,\(^3^5\) who then declare the statement made by the alleged victim to be sound and truthful on feeble grounds.\(^3^5\)

Cases of this kind tend to be handled wrongly by the police often resulting in grave problems for the victim as well as the suspect and their family.\(^3^6\) I recently wrote a report for the Minister of Justice on how to prevent repressed memory cases from getting out of hand.\(^3^7\) Formal guidelines for the police and the prosecution, based partly on my report, are now under preparation. Hopefully, problems with repressed memory cases and the expert testimony given in them will be prevented in future.

9 Interviewing suspects

Until recently, Dutch psychologists were hardly ever involved in evaluating questioning of suspects by the police. Two developments changed this. First, the police increasingly videotape interviews in major cases. This makes subsequent analysis of what happened possible. In other cases, analyses have to be based on the interview record. These records always consist of a summary in the form of a monologue by the suspect, written down by and in the words of the interviewing police officer. Only in rare


\(^{34}\) Often by the attorney of the alleged victims, since in these cases a criminal procedure is often accompanied by a civil suit for damages.

\(^{35}\) See e.g. the case discussed in P.J. van Koppen and H.L.G.J. Merckelbach, De waarheid in therapie en in rechte: Pseudohereninneringen aan seksueel misbruik (The truth in therapy and in law: pseudomemories of sexual abuse), Nederlands Juristenblad, 1998, 73, pp. 899–904. See more general on the Dutch situation H.F.M. Crombag and H.L.G.J. Merckelbach, Hervonden herinneringen en andere misverstanden (Recovered memories and other misunderstandings), Amsterdam: Contact 1996.


How Psychologists Should Help Courts – Peter van Koppen

cases interview records do give real insight into what happened in the interview room.

Second, the police in Zaanstad, together with someone who calls himself a communication expert, developed a method to induce virtually every suspect to confess. This method, commonly known as the ‘Zaanse’ interrogation method, is based on the one proposed by Inbau and Read, supplemented with sound and unsound police practices and covered with a quasi-scientific sauce of neurolinguistic programming. The strongest public reaction was caused by the case in which the suspect was put under pressure by covering the walls and ceiling of the interview room with photos of the very bloody crime scene and of his wife and children. Although the Minister of Justice has forbidden the method, parts of it are still in use by the police. In cases of this kind psychologists are called in to demonstrate to the Court the influence the interview method has had on the confession by the suspect.

As a rule, expert testimony in cases like this is less problematical than in cases in which a psychologist is called in to assess the veracity of statements. The main reason apparently being that in the latter type of case the psychologist is hired to solve a problem of the Court or the prosecution. They are more interested in the psychologist’s conclusion and less interested in how he reached his conclusion. Anticipating this, psychologists usually refrain from explaining their methods and reasoning extensively. In cases where the psychologist is asked — usually by the defence — to comment on police interviews, their reasons for evaluating the police methods as correct or incorrect are the heart of their testimony.

39 Inbau, F.E., J.E. Reid and J.P. Buckley, Criminal interrogation and confessions, Baltimore, MD: Williams & Wilkins 1986.
41 See also European Committee for the Prevention of Torture and Inhuman and Degrading Treatment or Punishment (CPT) (1998) Report to the Netherlands government on the visit to the Netherlands carried out by the European Committee for the Prevention of Torture and Inhuman and Degrading Treatment or Punishment (CPT) from 17 to 27 November 1997. Strasbourg: Council of Europe.
42 The Dutch Supreme Court is, as usual, more lenient. See HR 22 September 1998, NV 1999, p. 104 (Zaanse Verhoornmethode; Zaandam Interrogation Method).
Chapter III: Forensic Expertise and Criminal Procedure

The same seems to apply to cases in which psychologists testify on other kinds of police behaviour, for instance eyewitness identification procedures. Maybe explaining methods and reasoning is easier in these cases because well established standards exist for eyewitness identifications.

10 Eyewitness Identification

Cognitive psychologists testify most often about problems relating to eyewitness identification. Much is known about proper identification procedure and the police in the Netherlands have clear-cut instructions for conducting such procedures. Still the police generally proceed incorrectly. The most common error is the use of a one-person show-up instead of a proper line-up when the witness knows the perpetrator from the crime scene alone.

A witness confrontation is used to assess whether the appearance of the suspect corresponds to the memory the witness has of the appearance of the perpetrator. The witness memory may be vague, so a good confrontation procedure answers two questions: (1) is the witness' memory of the perpetrator good enough; and (2) does the memory correspond to the appearance of the suspect. This dual objective is achieved by confronting the witness with a line-up of people who all conform to the general description of the perpetrator. One of these is the suspect; the others are innocent foils unknown to the witness. The witness' task is to indicate the one person in the line-up he recognises, if he recognises anyone at all. The result of a properly conducted line-up has a very high diagnostic value. It is essential, however, to ensure that if the witness points out the suspect, he does so solely on the basis of his memory of the perpetrator. All other cues that could indicate to the witness which person in the line-up is the suspect must be eliminated. For this reason the behaviour and clothing of the persons in the line-up should not differ, nor should the policeman who guides the witness during the line-up know who the suspect is.

Apart from live line-ups, confrontations can be conducted in two other manners: (1) videotaped line-ups or photospreads; and (2) a one-person show-up. These serve other purposes. Mug shots are photos of known

44 I did not conduct a survey, but base this assertion on discussions in the rather small community of psychologists who testify in court.
How Psychologists Should Help Courts — Peter van Koppen

criminals. If done properly, these are only shown to witnesses in investigations in which the police have no idea where or how to find the perpetrator. The police show the witness a selection of photos of known criminals who conform to the description given by the witness. If the witness points one out, that individual always becomes a suspect. This leads to a suspect-driven search, which has the potential of generating a miscarriage of justice. For this reason mug shots should not be used as evidence by the Court.

The one-person showup should be used in one situation and one situation only: when the witness already knew the perpetrator before the crime took place. The identification then took place at the scene of the crime and showing the suspect to the witness only serves to prevent administrative errors (“Is this the neighbour you meant?”). If the witness knows the perpetrator by name, this procedure is unnecessary. If used with a witness who only saw the perpetrator at the scene of the crime, the one-person showup is much more likely than properly constructed line-ups to yield false identifications. The one-person showup is much too suggestive, because with this procedure the police are telling the witness: “We’ve got the perpetrator. You merely have to confirm it”. If, in a proper line-up, the eyewitness has no good recollection of the perpetrator or the suspect is innocent, he is most likely to identify an innocent foil, which can be detected as an error. The one-person showup does not have such a provision.

In Dutch police practice most identifications are attempted using the one-person showup. This seems to be a structural problem that is caused by two things. First, although the principles of a line-up are simple, organising one is time-consuming. People from a model agency must be hired to serve as foils. They must be present at the same time as the witness, the suspect, his attorney, the prosecutor, and a number of policemen not involved in the investigation, and then the show must be run by the book. A one-person showup is much easier. Besides, Dutch courts are very lenient about how identification procedures are conducted. In conducting an identification parade it is essential to ensure that the witness bases the identification of the suspect solely on his memory of the perpetrator, care must be taken to eliminate all other cues that could lead to the witness to identify the suspect. Courts, however, routinely accept procedures which violated one or more of the requirements.


Chapter III: Forensic Expertise and Criminal Procedure

The police regularly make every conceivable error in identification procedure. A 1998 case provides one example of such. In that case a witness saw five men in a car. One of them had a gun. Five suspects had been arrested and the police officer running the investigation showed to the witness each suspect in succession in a one-person showup. Each time, the witness identified the suspect. It is, however, still not answered which of the suspects had held the gun. The police report reads as follows:

"After Dekkers had been confronted with each of the suspects, he stated that he recognised all of them. He had not yet indicated which of the suspects had held the gun, however. Then I asked him to indicate which suspect had held the gun. Dekkers said he was not sure and hesitated between numbers 1 and 3. I, subsequently, informed Dekkers that both other witnesses had indicated the first suspect. I told him he need not doubt and that he could identify number 1 with confidence. Dekkers then stated that the first suspect had held the gun."

In cases like these the defence time and again calls in cognitive psychologists to explain to the Court what went wrong.

11 Standards for expert psychologists

By way of conclusion, I offer a list of standards for psychological expert testimony. This list has been drawn up mainly with a view to problems encountered in the Netherlands, but I see no reason why they should not apply to expert testimony abroad.

The Dutch Supreme Court has established some standards for expert testimony, but the examples given above make it clear that these standards need to be expanded and supplemented.

In assembling the list I assume that an expert writes a report for the Court in addition to providing oral testimony. This does not mean that other standards should apply to oral testimony. Complying with these standards, however, is much easier if the expert provides the Court with a written report. Explaining methods and research, for instance, requires reference to and consultation of scientific publications, something that is not feasible in a courtroom. In addition, it is easier to formulate precise conclusions behind a quiet desk than during the trial.

1. The psychologist should be an expert on the subject matter on which he testifies and should explain in his report why he considers himself an expert.
2. The expert witness should show awareness of the limitations of his role. He should not enter into the domain of the Court.
3. Psychotherapists should never offer opinions on the value of evidence.
4. Psychologists who serve as expert witnesses should limit their testimony to subject matter to which psychology is relevant.
5. The psychologist should show that his testimony and the underlying research are relevant to the case in point.
6. The psychologist should show that he is competent to apply the specific method to the specific case.
7. Expert testimony encompasses application of scientific knowledge to particular cases. For this reason the expert should apply sound empirical research, must tell the Court which results of research he has applied, and why the research is relevant to the specific case or its circumstances.
8. In applying sound research, the scientific knowledge, which the expert presents to the Court, must be evaluated according to:
   a. whether it is grounded in scientific methods and procedures;
   b. whether it is based on empirical research rather than on the expert’s subjective belief or unsupported speculation;
   c. whether the theory or method applied by the expert has been subjected to peer review and publication;
   d. whether the methods used are valid enough to serve as a basis for the Court’s decision;
   e. whether the expert gives an accurate account of the discussion in the scientific community. 51

These, and perhaps other, guidelines are urgently needed in the Netherlands and probably in other European countries as well. Maybe developing such guidelines is an excellent task for the flourishing European Association for Psychology and Law.

References

European Committee for the Prevention of Torture and Inhuman and Degrading Treatment or Punishment (CPT), *Report to the Netherlands government on the visit to The Netherlands carried out by the European Committee for the Prevention of Torture and Inhuman and Degrading Treatment or Punishment (CPT) from 17 to 27 November 1997*, Strasbourg: Council of Europe 1998.

51 The reader will recognise some standards set by the United States Supreme Court in *Daubert v. Merrell Dow Pharmaceuticals Inc. 113 S.Ct. 2786 (1993).*
Chapter III: Forensic Expertise and Criminal Procedure


Inbau, F.E., J.E. Reid and J.P. Buckley, Criminal interrogation and confessions, Baltimore, MD: Williams and Wilkins 1986.


Meehl, P.E., Clinical versus statistical prediction: A theoretical analysis and a review of the evidence, Minneapolis: University of Minnesota Press 1954.


Read, J.D. and D.S. Lindsay (eds), Recollections of trauma: Scientific evidence and clinical practice, New York: Plenum 1997.


van Koppen, P.J. and H.L.G.J. Merckelbach, De waarheid in therapie en in rechte: Pseudo-

van Koppen, P.J., A.J.W. Boelhouwer, H.L.G.J. Merckelbach and M.N. Verbaten, Leugen-
detectie in actie: Het gebruik van de polygraaf in de praktijk, Leiden: Nederlands Studiecen-
trum Criminaliteit en Rechtshandhaving (NSCR) 1996, (Rapport aangeboden aan de
Minister van Justitie).

van Koppen, P.J., Bekennen als bewijs: Bedenkingen bij het verhoor van de verdachte, Justi-

van Koppen, P.J., Hervonden misdrijven: Over aangiftes van seksueel misbruik na therapie,
Leiden: Nederlands Studiecentrum Criminaliteit en Rechtshandhaving (NSCR) 1997,
(Advies aan de Minister van Justitie).

van Koppen, P.J., Recovered crimes: Sexual abuse reported to the police after therapy, Leiden:
Netherlands Institute for the Study of Criminality and Law Enforcement (NISCALE)
1998, (Advice to the Minister of Justice), (translation of P.J. van Koppen, Hervonden mis-
drijven: Over aangiftes van seksueel misbruik na therapie, Leiden: Nederlands Studiecen-
trum Criminaliteit en Rechtshandhaving (NSCR) 1997, (Advies aan de Minister van
Justitie)).

van Koppen, P.J., Sniffing experts: Theory and practise of scent line-ups, Expert Evidence,

Vrij, A. and S.K. Lochun, 'Neurolinguïstisch verhoren', in P.J. van Koppen, D.J. Hessing
and H.F.M. Crombag (eds), Het hart van de zaak: Psychologie van het recht, Deventer:

Vrij, A., 'Verhoren van de verdachte en bekentenissen', in P.J. van Koppen, D.J. Hessing and
H.F.M. Crombag (eds), Het hart van de zaak: Psychologie van het recht, Deventer: Gouda

Wagenaar, W.A., P.J. van Koppen and H.F.M. Crombag, Anchored narratives: The psychology

Wells, G.L., M. Small, S. Penrod, R.S. Malpass, S.M. Fulero and C.A.E. Brimacombe,
Eyewitness identification procedures: Recommendations for line-ups and photospreads,

Werkgroep Identificatie, Rapport identificatie van personen door ooggetuigen, Den Haag: Minis-

Wigmore, J.H., The science of judicial proof as given by logic, psychology, and general experience,

Yarmey, A.D., M.J. Yarmey and A.L. Yarmey, Accuracy of eyewitness identifications in
7 Witness Statements Based on ‘Recovered Memories’:
A further examination

Willem-Albert Wagenaar

1 Expert opinions of witness statements

Witness statements are nearly always about what the witness can remember. Nevertheless, memory is fallible. The judge cannot unquestioningly assume that witness statements are true. Experts on the subject of human memory cannot and must not determine whether recollections are true or untrue. This task belongs to the judge only. The information the expert provides must be limited to a review and assessment of the circumstances of importance to judicial decision-making. In principle, this task can be well executed since a great deal is known about the circumstances that make the memory authentic or less authentic. The contribution of experts is not insignificant, merely confirming what everybody already knows. To the contrary, public opinion holds many misconceptions about the functioning of human memory and about the indicators of reliability. The following overview aims to outline the information that should in any case be included in expert testimony concerning witness statements based on recovered memories.

2 Recovered memories

Recovered memories means that the events now remembered occurred years earlier. The witness claims that he or she has been unable to testify about them previously because these memories were blocked out for many years. These memories usually concern sexual abuse. Whether such memories exist is a subject of intense debate in brain research today: memory of an important traumatic event or series of events that was gone and then surfaced again. Part of the discussion concerns whether these memories were really gone. An alternative explanation is possible: it could instead be a question of not wanting to think about these events which is much different from not being able to think about them because a part of the memory is inaccessible. Another alternative is that it is chiefly a question of a changed perspective: the events were not repressed but their real meaning was not understood earlier. The third, most frequently discussed, alternative is that the memories are false creations, born of suggestibility and therapists’ leading questions or recovered as a result of reading popu-
Chapter III: Forensic Expertise and Criminal Procedure

lar scientific literature, or even after viewing dramatized television film or
talkshows. This is not the place to debate the true nature of recovered
memories. Let it suffice to say that there are enough cases in which the
memories were either never really gone or were not based on reality.

The legal question that arises in dealing with recovered memories is often
of a dual nature. The first question is whether the period during which the
memory was blocked is an acceptable explanation for the fact that a very
long period of time passed before the witness reported the offense(s). The
second question is whether the recovered memory is based on truth.
Questioning witnesses who report recovered repressed memories must es-
pecially make it clear whether one of these explanations is applicable. Con-
sequently, the interview will focus on the circumstances under which these
memories resurfaced rather than on the content of the memories.

The following list may seem to suggest that witnesses with recovered
memories should be interviewed as though they were suspects instead of
victims. This is, of course, not the intention, but legal logic gives the sus-
pect the benefit of the doubt. In cases of recovered memories it is usually
one story against the other without physical evidence to qualify the story of
the witness as true. The suspect will continue to enjoy the benefit of the
doubt unless all suspicions that the recovered memory is a false memory
can be removed. The reliability of a recovered memory should be sub-
jected to an exhaustive examination.

The following list of issues requiring examination is meant for all who
are involved in the investigation: police, prosecutorial service, judge of in-
struction, trial judge and expert witness. It can be used as a kind of check-
list to make certain that all information is available that is essential for
concluding that a recovered memory can be accepted as reliable evidence.
The list is not drawn from an established list, but based on the interna-
tional debates concerning this subject.

3 Preliminary questions

First of all, it is essential to determine when the memories resurfaced and
what circumstances led to their recovery. It is also necessary to ascertain
whether there was total amnesia for a while within this time frame. What
indicates amnesia and can this be determined objectively? Or is it more
likely that the witness did not want to think about the memories for a pe-
riod of time, without these memories really being blocked out? In addition,
one must ask what aspects have suddenly been recovered: the facts of the
events themselves or the meaning of the events? For instance: did the wit-
ness forget sitting on the teacher’s lap or was the witness simply never
aware of the implications of what the teacher did? Neither of these cases
involves recovered memories giving little reason to work through the entire
list of questions, mentioned below.

278
4 The role of therapists

Once a memory has been qualified as 'recovered', the most important question is whether the witness has recently undergone psychotherapy or counseling and whether this therapy has played a role in recovery of the memories. If there is a suspicion that the therapy might have played a role in recovery of the memories, the therapist should also be interviewed. The therapist's beliefs concerning 'recovered memories' must be established. It is not unusual for therapy to be directed at reconstruction of a traumatic past; the manner in which this has occurred, however, must be carefully investigated because it may have prompted the false reconstruction of that past. It is very important to determine who first brought up the subject – in many cases sexual abuse—the therapist or the witness. It is also important to know what training the therapist has had, whether the therapist has taken a course in recovered memories or has any publications concerning the status of recovered memories.

5 Other persons who influence the witness

Therapists are not the only persons who may have led witnesses down the path of suggested memories. The defense counsel may also have played an important role. For this reason, counsel's views on the subject should also be explored. Some counsel have defended a whole series of cases involving recovered memories. In addition, a suggestive manner of questioning by police detectives may have led witnesses to recollect events that did not take place. Recorded police interviews have indicated several important factors: the length of the interview, the number of interviews, the degree of intimacy in the relationship between the police officer and the witness, and the type of questions asked. In the absence of good records of police interviews, the interviewing officers may have to be heard.

6 Familiarity of the witness with the phenomenon

It is also quite possible that a witness has imagined recovered memories outside a therapeutic treatment setting. To gain the necessary insight, questions need to be asked to learn about the familiarity of the witness with the phenomenon. Is the witness acquainted with 'survivor literature', literature in which other witnesses describe their recovered memories? Has the witness been in touch with someone in a shelter or an institution, for example, who has recalled memories in a similar manner? One very important sign is the use of social work jargon by a witness indicating that he or she has been in contact with the world of ideas to which recovered memories belong.
Chapter III: Forensic Expertise and Criminal Procedure

7 Third parties

The witness may have spoken to others about events before the memories became blocked out. It is important to question these third parties as thoroughly as possible to be sure that they were not informed about the events after the witness recovered the memories. A reliable confirmation of the statements made by witnesses claiming recovered memory can eliminate the problem of the status of recovered memories at least in the case in question.

8 Further information about the witness

As a rule, we will want to know more about a witness who claims recovered memories than about other witnesses. The reason is that there are many possible mechanisms in the psychological functioning of a witness that can be conducive to knowingly or unknowingly making a false statement. It is almost inconceivable that such witnesses should not have to undergo an independent psychological examination in which they answer a number of relevant questions. My enumeration in this paragraph was never meant to suggest that police detectives or judges of instruction should study this problem in depth by themselves.

a Does the witness have a motive for making a false statement?
   Examples include:
   • the wish to harm the suspect
   • the wish to remove the suspect from the immediate vicinity
   • the wish to blame someone else for one’s own failure
   • the wish to benefit considerably, for example financially
   • the wish to excuse one’s own unacceptable (sometimes punishable) behavior
   • the wish to let the therapy succeed in cases in which going to court is implicitly or explicitly required as an essential step.

b In connection with the above it is also necessary to investigate whether the witness has made apparent false accusations in the past in the home, at school, in a foster family, in a home or institution. It is also important to know whether a close member of the family, like a brother or sister, has ever made an apparent false accusation, since that may have given the witness an idea.

c Does the witness suffer from an evident psychiatric illness which makes a high degree of suggestibility likely? One such example is the multiple personality disorder, which is frequently accompanied by recovered memories. Without going into the vehement discussions between professionals concerning the status of the multiple personality syndrome and the degree to which the syndrome is a product of suggestive therapeutic methods, it is important to at least note that a witness who
Witness Statements Based on 'Recovered Memories' — Willem-Albert Wagenaar

claims to have multiple memories that are inaccessible and possibly contradictory to each other is not really ideal. Another relevant psychiatric disorder is the tendency toward confabulation, pathological fantasizing, pathological lying. Here too there is no need to discuss the direct relevance for the statement made by the witness. It will suffice to note that such a witness is not ideal when the evidence must be based entirely on the statement made by such a witness.

d Further, it is important to determine whether the witness should be considered capable of inventing the details of the memories. Has the witness had access to certain people, books, magazines, videos, TV programs, films that could have served as sources of information?

9 Critical examination

The reality content of the recovered memories needs to be critically examined. Quite often such memories contain illogical or even impossible elements. The memories of satanic ritual abuse are such an example. This entire category of abuse is somewhat suspect because in the Netherlands it has never been possible to substantiate anything whatsoever of these memories. The witness should not be given the benefit of the doubt. There needs to be a search for concrete evidence. The fact that many of the descriptions of satanic rituals are very stereotyped is a clear indication that the memories are possibly false. The same stories that can also be found in the satanic ritual literature appear again and again. Common elements include: chopping up newborn babies that have to be eaten; pushing neonates back into the vagina; the prompting behavior shown by the victim's mother who frequently turns out to have masterminded the organization; the involvement of numerous perpetrators, often including dignitaries, doctors and police officers. The fact that physical examination of the victim in such accusations finds no serious injuries or scars that one would normally expect to find in cases of this type is another indication.

10 Gradual awareness

An important aspect of memories created by suggestion is the gradual nature of the process. Often it is a question of interaction lasting several days or weeks during which the memories become concrete only very gradually. Frequently it is a matter of "visions out of a dream that slowly take shape", "disconnected fragments in the beginning", "scenes of a film that are not sharp at first and that gradually grow distinct". These descriptions can reflect a process of cognitive construction and should therefore be regarded as signs that the memories that result are false.
11 Repudiation by third parties

The recollected story often implies that there are third parties who are aware of what happened: parents, family, doctor, a member of the clergy, teacher, to name only a few. If these emphatically deny the events, this is an important fact. It is also important to assess how the witness explains this denial. One should seriously question the reality of the statement particularly when explanations sound like a grand conspiracy.

12 The judge's own area of competence

Finally, it is important to note that there is a clear distinction between collecting relevant information concerning a recovered memory and deciding whether one wishes to believe the recovered memory. This contribution concerns the first of these only; it aims to help fill the case file with information that the judge can subsequently use to form an opinion. It is not my intention to provide guidelines for weighing up the information itself. Precisely because the status of recovered memories is still fiercely debated among professionals, it is impossible to formulate diagnostic criteria that make it possible to distinguish true from false. The above-mentioned questions are meant only to remove doubt where possible or to point out elements that give rise to doubt. The latter is of immense importance because, as previously mentioned, it is frequently a question of one account against another. Since not one professional will deny that in some, even notorious, cases recovered memories proved to be a product of suggestion, these memories should be examined critically in a situation in which the suspect should be given the benefit of the doubt. The trial judge will be helped only by a systematic exploration of all relevant circumstances even though this will be a painful experience for the witness.

Reference

Read, J.D. and D.S. Linsay (eds), Recollections of Trauma-Scientific Evidence and Clinical Practice, New York: Plenum 1977.
8 Legal Regulations Governing Forensic Scientific Methods

Lia van der Westen

1 Introduction

There are few legal regulations governing forensic examination. Many countries have framework legislation for certain scientific areas and set requirements for forensic expertise in that area. In the Netherlands, for example the Code of Criminal Procedure stipulates the conditions for DNA profiling.\(^1\) Prescribed practice is laid down in subordinate regulations.\(^2\) The law does not specify the forensic method to be used in DNA profiling.

Most methods of forensic expertise are unregulated by law.\(^3\) Frequently forensic scientists work to the stringent standards fully accepted and laid down in their area of expertise, however these regulations do not have the force of law.\(^4\)

Drawing on responses to the questionnaires, this paper will compare the rules governing the methods used in selected areas of forensic examination in various countries. Two areas in which there are extensive legal regulations will be considered: DNA analysis and driving under the influence of alcohol. A cross-country comparison will also be made of fingerprint examination, a forensic scientific area in which the used norms are subject in part to regulations agreed upon by the relevant scientific community without legal regulation.

2 DNA\(^5\)

To enable the exchange of results of DNA analysis it is important that the techniques employed in DNA profiling in the different countries be comparable. Consider, for example, the comparison of a DNA profile with the

---

1 This law establishes, among others, which authority may order a DNA analysis and under what circumstances a suspect must co-operate.
2 These regulations determine, among others, which laboratories may perform a DNA analysis, how samples must be obtained, how the identity of the samples must be ensured and what standards of quality must be met by the laboratory. In addition, a separate regulation has been drawn up for the DNA database.
3 Many forensic examinations, in particular identifications, involve data sensitive from the perspective of personal privacy and are therefore subject to privacy legislation.
4 The court will certainly take regulations laid down by the profession into consideration in its assessment of a method of analysis.
5 This description draws on the answers received from 17 respondents in 10 different countries: Austria, France (3), Germany (2), Malta, Netherlands, Poland (3), Slovakia, Spain, Turkey (3) and Sweden.
database of another country. It is for this reason that forensic scientists use a European standard set of markers (ESS) -initially four,- currently seven, specific markers for DNA analysis.\textsuperscript{6}

It is also important to know that the circumstances under which the DNA analysis took place in one country will not adversely affect the admissibility of the results of a DNA analysis by the court in another country. Factors that can be of importance in this respect are:

1 whether the technique used in DNA analysis and the relevant legal regulations differ too much from those in the receiving country where the results may be presented as evidence in criminal proceedings.
2 whether the law in the receiving country would have allowed DNA profiling under the same circumstances.

This paper examines a number of possible legal impediments to use of data from other countries.\textsuperscript{7}

2.1 \textit{Sampling powers}

Article 8 of the European Convention for Human Rights spells out the right to privacy and a privilege against self-incrimination can be derived from Article 6. According to Article 8, the right to privacy may be limited by a legal regulation that is necessary in a democratic society. Against this background, the DNA legislation of the Member States of the Council of Europe contains a provision concerning the collection of biological evidence from suspects. The responses to the questionnaire indicate that most countries require the authorisation of the prosecutorial office or an examining magistrate in order to collect biological evidence from a suspect. The respondents from France and Spain alone report that samples may be taken only with the consent of the person in question.

In the Netherlands, taking samples from a suspect without consent for DNA analysis is subject to certain restrictions. Under Dutch legislation, samples may be taken without the suspect’s consent if the offence in question is punishable by a prison sentence of 8 years or more or if the offence belongs to a certain category of offences including sexual offences.\textsuperscript{8} These are the only cases in which an order may be given to take a sample.\textsuperscript{9} These conditions do not apply if the suspect consents.

\textsuperscript{6} See Marjan de Boer in this volume.
\textsuperscript{7} To begin with, it is important to note that the answers received from the respondents from the same country do not always concur. Nor is it possible at present to draw conclusions concerning the status of the regulations mentioned by the respondents.
\textsuperscript{8} Parliament is currently considering a bill which lowers this limit to 4 years.
\textsuperscript{9} It is not possible to determine from the responses to the questionnaire whether a certain degree of suspicion (certain amount of evidence) is required before samples can be obtained. Translation of the different legal terms into English as well as the unfamiliarity of forensic scientists with legal terminology seem to be the reasons for this.
Some other countries also have legal restrictions that limit the possibility of sampling. Once the prosecutorial office or the examining magistrate has authorised sampling, the suspect is in theory compelled to provide a body tissue sample for analysis. Not every suspect is willing to co-operate. Does legislation make it possible to take samples of body tissue under these circumstances? Legislation in several countries allows the use of physical force. Refusal to co-operate after a justice authority has given authorisation can also be punished as a separate punishable offence.

Several countries impose requirements on collecting specimens of biological evidence and sending them to the laboratory for analysis. The status of these regulations varies; some are legal regulations, some are laboratory regulations or regulations agreed upon by the profession like the general guidelines for collecting biological evidence.

Reactions to failure to the established requirements varies. Depending on the nature of the error, the analysis is carried out or the body tissue is destroyed. In some countries like the Netherlands, it is not the laboratory that decides. Generally, the material will be analysed and the error noted in the report.

2.2 Who performs the DNA analysis
Appointment of a forensic scientist to perform the DNA analysis is regulated by law in most countries. In Sweden experts are not formally appointed in any area of expertise. Diverse justice authorities are empowered to appoint experts. In all countries that responded to the survey (with the exception of Sweden) the court is authorised to appoint an appropriate expert to perform DNA analysis. In several countries, including the Netherlands and Turkey, the prosecutorial office may also appoint the expert, while in France, Poland and Slovakia the police also have this power. In most countries, with the exception of Turkey, Spain, and of course Swe-

10 Respondents from Germany (1), Poland (1) and two of the three respondents from Turkey mention the existence of restrictions on sampling. At present, there is no information available concerning the nature of these restrictions.
11 This possibility was mentioned by respondents from Austria, Germany (2), Poland, Turkey, one of the three respondents from Slovakia and Sweden. This is also the case in the Netherlands.
12 The respondents from Slovakia and one from Turkey indicate this. According to the respondent from Germany, this is possible only if there is a victim.
13 According to the respondents from Austria, one of the three respondents from France, Germany, one of the three from Poland, Slovakia, one of the three from Turkey and Sweden, the assessment of the error is decisive. The other two respondents from France and one from Poland report that the material is always destroyed in case of error.
14 According to respondents from Germany, the Netherlands, one of the three from Poland, Slovakia, Spain and three from Turkey. Here too respondents from the same country provide different answers.
15 Lia van der Westen in Chapter V of this volume.
16 In the Netherlands the authority of the prosecutor is limited to those cases in which there is as yet no suspect. In the legislative proposal the prosecutor will also have this authority, if the suspect is known.
den, only experts who are on the official list may be appointed. In Austria, Germany, the Netherlands, Slovakia and according to one respondent from Turkey, the law also determines which laboratory(ies) may perform profiling. Analysis must meet certain established quality requirements varying from laboratory protocols to accredited method.

The responses to the questionnaire warrant the general conclusion that considerable differences as well as similarities exist in the regulations and the performance of DNA analysis. Most countries have devoted attention to the issues touched on in the survey. There are large differences in the performance of these analyses, particularly in the procedures for obtaining samples, that can be attributed partly to cultural differences. Some countries, like the Netherlands, attach great importance to privacy issues in the collection of evidence so that sampling requirements are stringent by comparison with other countries. When technological advances make it possible to secure material without medical intervention – saliva instead of blood – a reaction follows and the threshold for non-consensual sampling is lowered immediately. This has to do partly with the greater insight into the expanded possibilities DNA analysis offers in the investigation of widely diverse offences.

3 Alcohol determinations in connection with road traffic offences

In many countries the provisions regulating determination of the level of alcohol in the blood or breath of a driver have been in effect longer than the DNA provisions. The regulation of procedures for obtaining blood samples for DNA profiling have given rise to the same arguments and considerations as those heard in connection with alcohol determinations. Taking blood samples necessitates an invasion of a person’s privacy. The European Convention for Human Rights requires statutory regulation of such intrusive procedures. In the Netherlands there are crucial differences between the two regulations. In the first place blood samples for alcohol determinations may be taken only if the police have reasonable ground to suspect that a person driving a motor vehicle has violated the relevant article of the Road Traffic Act: driving with a blood-alcohol concentration above the prescribed limit. The scope of this regulation is therefore more limited. The provision may not be used for purposes of determining the alcohol level in blood following homicide. The major difference between the two regulations is that a person may be compelled against his or her will to provide blood samples for DNA testing. The statute allows use of force if the individual refuses to cooperate. The alcohol provisions do not allow use of force. If an empowered authority has ordered a blood sample,

17 Responses have been received from the following countries: Germany, Spain, Turkey, France and the Netherlands.
a driver suspected of drink driving is liable to punishment for refusal to cooperate. As a result of technological advances, alcohol determinations have been performed on specimens of breath rather than on blood samples since 1987. Under current law, a blood sample may still be obtained, if the driver is unable to produce a sufficient volume of breath or if the defence wishes to have a sample for independent confirmatory analysis.

The survey asked about the national legal alcohol limit for driving. In all five countries that replied to this question, a limit for alcohol concentration has been established by law. The way in which the legal limit is stated differs. In some countries the maximum alcohol content allowed in expired air, expressed in mg/l, is 0.25. The prescribed blood alcohol limit in all five countries is 0.5g/l.

As a rule, the police have a general power to require drivers to undertake a breath test. Provisions also stipulate how many breath specimens may be taken and how often the accuracy of measuring devices must be tested and evaluated. Furthermore, in several countries there is a prescribed interval of time between stopping a driver and measuring breath alcohol. In Germany this is 10 minutes, in the Netherlands 20 minutes, in Spain 10-15 minutes and in Turkey 15 minutes. This raises an interesting point in the Dutch situation. The court of appeal has held that the 20 minute provision must be strictly observed. What will the Dutch court do if the case involves an analysis carried out in Germany in accordance with German law but not with Dutch law? Published jurisprudence in the Netherlands indicates that the Dutch court will examine whether the legal time limit has in fact been observed to ensure that the suspect’s interests have not been prejudiced under Dutch law.

The possibilities for obtaining specimens for later replicate or counter analysis are not the same in all countries. Spain and the Netherlands have regulated this possibility, whereas the respondents in France, Germany and Turkey report that this is not the case in their countries.

In France and Spain the measurements are averaged to arrive at the results of the analysis. A correction factor is applied in the Netherlands and Germany and mentioned in the report. In calculating the results, the allowed maximum range (e.g. expressed in percentage) between the single

---

18 In Germany and France. In the Netherlands the maximum amount is 0.22 mg/l (officially 220 ug/litre). The respondent from Spain mentions two values: 0.4 – 0.25. Neither of the respondents from Turkey indicate legal limits for the maximum alcohol content allowed in expired air.
19 The respondent from Spain indicates a limit of 0.8 – 0.5.
20 DD 87.114
21 In Germany a correction is made to the temperature of the air at 34°C. In the Netherlands, if Y<5000 ug/l then result = (0.9Y-30) and if Y> 500 ug/l then result = (0.85Y-5).
measurements from which the median value is determined is 10% of the lowest level in Germany and the Netherlands.

For alcohol determinations there are provisions relating to blood-alcohol analysis as well as breath analysis. With a view to a driver's right to an independent additional analysis, two separate blood samples are taken in France and the Netherlands, whereas in Germany the original sample is stored for two years. The final results of the blood analysis also depend on the average values which may not diverge too widely and which must be corrected according to established procedure in Germany and the Netherlands.

The limit set for the interval of time between stopping the driver and the sampling time for blood analysis is far different from that for breath analysis. The minimum interval of time required between stopping the driver and obtaining a blood sample differs widely from country to country. In France the blood sample is drawn as soon as possible. There is no limit in Germany. In the Netherlands a blood sample may be taken only after an hour. As is the case in breath analysis, the court carefully examines observance of this legal requirement.

The results of the analysis can be corrected with respect to the lapse of time in France after an incident and in the Netherlands after a written request by the public prosecutor. The Netherlands is the only country to allow conversion of the urine alcohol level into blood alcohol level.

All the countries included in this survey have provisions governing the procedures for obtaining blood samples. These provisions stipulate that the blood samples may be drawn only by a physician.

Further examination of the statutory provisions reveals many striking differences between countries. Dutch jurisprudence indicates that courts adhere strictly to the periodic evaluation of the accuracy of the devices used for breath analysis as well as to the prescribed time limits. The stringent legislation and strict application of the law are aimed at preventing infringements of the guarantees anchored in the European Convention for Human Rights. Exchange of the results of analysis could be problematic unless the report clearly indicates that the requirements that hold in the receiving country have been met.

4 Fingerprints

No biological material is necessary for fingerprint comparison. The impression made by the papillary ridges on the ends of the fingers and thumbs is sufficient. For this reason, the provisions governing the examination of fingerprints differ greatly from those established for the two previous forensic science techniques. To ensure privacy, provisions have been drawn up in the Netherlands governing storage of fingerprint identification data. Fingerprint impressions are not made of every suspect apprehended
but only for those who are in custody. The legal status of these provisions is different from those governing alcohol determinations and DNA analysis.

One impediment to data exchange and harmonisation of fingerprinting techniques is the criterion for identification. For this purpose the so-called "dactyloscopic points" are counted. How many points are considered necessary to directly identify the offender? The number of points needed for positive identification is not the same in all countries surveyed. The table on the following page indicates the number of points required by the various countries in order to arrive at a positive identification. The responses reveal striking differences in the number required by the police and by the forensic laboratory within the same country. Columns three and four of the table indicate whether deviation from the identification standard occurs for reasons of expediency to facilitate investigation. A distinction is made in the table between the police and the laboratory standard for positive identification. The last column presents standards referred to in the literature.

<table>
<thead>
<tr>
<th>Minimum points for positive identification</th>
<th>Is the identification standard put aside?</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Police</td>
<td>Laboratory</td>
</tr>
<tr>
<td>Austria</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latvia</td>
<td>10 or more</td>
<td>Yes</td>
</tr>
<tr>
<td>Malta</td>
<td>14</td>
<td>No</td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>12</td>
<td>No</td>
</tr>
<tr>
<td>Russia</td>
<td>7</td>
<td>Yes</td>
</tr>
<tr>
<td>Slovakia</td>
<td>12</td>
<td>Yes</td>
</tr>
<tr>
<td>Spain</td>
<td>14</td>
<td>No</td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>12</td>
<td>Yes</td>
</tr>
<tr>
<td>Sweden</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>16</td>
<td>Yes</td>
</tr>
<tr>
<td>Turkey</td>
<td>16</td>
<td>Yes</td>
</tr>
<tr>
<td>Turkey</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other countries that require a rather high number of points for positive identification are the United Kingdom and Italy with 16 points. In some parts of Australia, Canada and in the United States of America there is no fixed number.

22 Not all respondents supplied answers to these questions.
Whether the 'objective' criteria should insist on a fixed number of points of ridge characterises is a subject of debate in many countries. Many favour lowering the standard and opting instead for a system in which the specificity of the characteristics plays a greater role. 'Qualitative' aspects — and as a result, statistical data — will be important as well as quantitative factors. In addition, ridgeology is being applied to fingerprint examination. This is the study of the uniqueness of the friction ridge structures and their use for personal identification.\textsuperscript{23}

Detection of fingerprints at the scene of the crime is over a hundred years old, yet the methods of developing fingerprints continue to evolve. Fingerprint comparison too seems to be at the dawn of a new era. The standard has remained stable in different countries for a long period of time, however this seems to be changing. Sound research in this area necessitates an international approach within working groups of umbrella organisations. Fresh insights can remove differences in standards and lead to harmonisation of evaluation criteria.

5 Concluding remarks

This paper has summarised the responses to survey questions about provisions regulating DNA analysis, alcohol determination and fingerprint comparison. All three examinations require an analysis or comparison of material on or from the body. The privacy regulation of the European Convention for Human Rights requires States to introduce legal provisions making it possible to obtain samples under certain conditions. The prerequisites for sampling and the circumstances under which an analysis takes place can differ from country to country. The final results of fingerprint examination are based on different standards in the countries surveyed. The disparity in provisions can therefore hinder exchange of data.

In addition, considerable changes are anticipated in DNA analysis in the Netherlands in any case. These changes are due to a large part to the advances in DNA technology which make it possible to produce good profiles from biological material (saliva) other than blood. Because the Dutch lawmaker regards the procedure for taking saliva samples as less intrusive than drawing blood samples the threshold for obtaining samples of biological material without consent has been lowered considerably. As a result of expansion of laboratory capacity, DNA analysis will be carried for more types of offences.

Overall, when assessing the legality and reliability of the results of forensic examinations performed in another country, the court should have insight into the forensic method and the circumstances under which the sample was obtained and the analysis performed. Harmonisation of the legal pre-requisites for forensic scientific examination within Europe – with the European Convention for Human Rights as the reference point – will make the court’s assessment easier. In addition to this, a forensic harmonisation is of course conceivable that will make it possible for courts to rely on forensic scientific results from another country.
Chapter IV

Quality
1 Introduction

To understand the importance of quality in relation to all the participants in the criminal process, we have only to envision what could happen if errors occur in the use of scientific evidence. The cases of the "Guildford four" and the "Maguire seven" are two examples of serious miscarriages of justice. The first article in this chapter focuses on this problem.

From the viewpoint of the forensic scientist in a Common Law country, Ian Freckelton analyses the commission of error by poor practice, defective methodology and sloppiness. He finds a significant source of error in the creation and maintenance of cultures that do not adequately respect objectivity and independence among forensic scientists. The closer the contact between forensic scientists and investigators or prosecutors, the more exposed they are to pressures from the police and the prosecution. The role of expectation and of personal factors are then discussed. Freckelton concludes that protection against scientific error and fraud lies at the core of sound scientific method, in a system of supervision, review and peer assessment of results to ensure a capacity for both replication and validity.

To this end, the integrity of data must be secured and testing processes be accountable. An important role in this matter can be played by quality assurance. Iris de Kwant discusses how instruments as a quality assurance system and accreditation can contribute to this in the forensic institute. The author discusses some of the results of work done by the research group “harmonisation in forensic expertise” on the present state of quality assurance in European forensic institutes and the possibilities for harmonisation in this area.

Lydia Bestebreur, Evert Korthagen and Wim Neuteboom focus on the specific complications a forensic institute may encounter when choosing to work in accordance with a quality assurance system. Factors linked to individuals, such as perceptive ability and the researchers’ experience, play a important part in many typical forensic tests. It is important, therefore, to pay constant attention to the search for suitable control points in order to ensure objectivity of the various forensic tests. In the first instance, emphasis will be placed on the procurement of objective test results. In a later phase it is also important to describe the steps of interpretation and, where possible, to apply measures of assurance. Here a significant role can be played by certification of experts. The authors foresee that the interchangeability of laboratory results will become more important on a European level. The ability to trust the work of colleagues on an international basis will certainly be greatly supported if the research takes place under the regime of a recognised quality system.
Chapter IV: Quality

In these articles, emphasis is laid on the contribution that quality can make in the forensic institute. *De Kwant* and *Bestebreur* briefly mention that the quality in the institute also depends on decisions made by other actors in the chain. For example, if the police deliver a poorly collected sample to the forensic institute, this in turn could affect the quality of the outcome of the scientific investigation, which again could affect the quality of the decision made by the judge in a criminal case.

*Mike Redmayne* goes further into this matter, and assesses quality with reference to the ends of the criminal process, which should be understood as decision-making based on accurate knowledge of the facts to which the decision relates. The ability of later actors to make good decisions depends on the decisions made at the early stages of an investigation. First he focuses on how decisions made by investigators affect the contribution of forensic science to the ends of the criminal process. Here he mentions awareness of the availability of the forensic technique and its potential contribution to the investigation, police policy, perception of the need for forensic science evidence in building a strong enough case and training and attitude of the investigator. The second actor in the chain is the forensic scientist, who applies the technique and interprets the results. His or her attitudes and abilities also affect the quality of information produced by the forensic technique. Quality assurance, peer review and accreditation can contribute to the empirical validation of the techniques needed to substantiate their claims. Next, the author considers the need for communication of results in clear and explicit terms, accompanied by sufficient background information to enable other decision-makers to contextualise the results. The judge or juror should only base their decision on expert evidence when he or she has good reasons for believing in the validity and reliability of the evidence. *Redmayne* concludes by mentioning ways in which harmonisation in forensic expertise might overlap with the concern to improve quality in relation to forensic science.

The last contribution in this chapter is the article by *Nick Huls*. He investigates the possible contribution of standardisation and other forms of regulation to the social cohesion debate. In his opinion, the interface between commercial and technological developments is an outstanding juncture for standards and technological norms. It offers a temporary point of reference in the chaotic and unpredictable dynamics of the market and scientific research. In this way, standardisation contributes to the cohesion of post-modern society. After he reviews the legal debate in the Netherlands on standardisation, he addresses the new European approach to standardisation. This approach leads to a new form of regulation, where the government no longer hands down decrees from above, but in which standardisation is effectuated in networks dominated by big businesses. The drawback to this approach is that the democratic legitimisation is flimsy, so many lawyers are inclined to deny force of law to standardisation.
that does not satisfy sound legal jurisdictional rules based on state law. *Huls* concludes with some recommendations for the normative regulation of standardisation.

*Iris de Kwant*
2 Quality and Forensic Science Evidence: an Overview

Mike Redmayne

1 Introduction: thinking about quality

In an essay addressing the problems of eyewitness identification evidence, Twining argued that commentators had tended to approach the issue from an unduly narrow perspective. Eyewitness evidence, he observed,

[H]as a bearing not only on adjudication of guilt or innocence, but on a wide variety of decisions each of which may have potentially harmful consequences for persons who are objects of identification; ... such information needs to be regarded not only as evidence, but also as potential evidence and as information relevant to other decisions; and ... the way in which it is 'processed' and used and the operation of factors which affect its reliability or completeness (or other 'validity') need to be considered at every stage in the process.¹

These comments are relevant also to the problems posed by forensic science evidence. Twining's cautionary essay reminds us that the problems of forensic science are not merely those of 'novel scientific techniques' (the topic of an enormously bloated literature in the United States); they are problems that arise in a variety of criminal justice decision-making contexts and impinge upon numerous different actors. Emphasising the link between eyewitness evidence and decision-making contexts serves a further expository purpose. Evidence, of whatever sort, does not announce its own inferences.² It must be processed by an actor before it assumes any value at all, and the value which it has for that actor will depend upon the context in which she operates. This leads us to another theme of Twining's work, which is that the subject 'evidence' might be profitably reconceptualised as 'information in litigation'.³ This, too, is an important concept when we address 'quality' as it relates to forensic science evidence, for it

3 Twining, W., 'Rethinking Evidence', in Rethinking Evidence, op. cit.
Chapter IV: Quality

reminds us that, ultimately, quality concerns actors and the cognitive processes by which they assess evidence. In this paper, I hope to use these two themes — a 'total process' view of evidence and an emphasis on cognitive factors — in order to sketch some of the concerns that might fall under the rubric of 'quality' as it relates to forensic science in the criminal process. Given that the contributions in this volume are intended to transcend national boundaries, my discussion will have a rather abstract flavour as I attempt to develop a model of the use (and non-use) of forensic science evidence that might be applied in any jurisdiction. Nevertheless, as my knowledge is bounded by my own national perspective, I shall anchor the general points I make with references to the use of forensic science in the criminal process in England and Wales.

We might start this model-building process with some general thoughts about quality and forensic science. Forensic science evidence can be said to possess quality insofar as it contributes to the ends of the criminal process. In this context, it is useful to see criminal justice as a process in which decisions are made which relate — primarily — to suspects, and to how criminal justice agencies should deal with them. Good decisions are those which discriminate between the innocent and the guilty and between different levels of culpability. Forensic science information possesses quality, therefore, to the extent that it generates cognitive states that will produce such good decisions.4

Some forensic science evidence — DNA evidence is an obvious example — can be extremely probative of guilt or innocence. The use of such evidence can obviously contribute to good criminal justice decision-making. But this contribution to decision-making accuracy will depend on a number of other factors. First, decision-makers have to collect crime-scene material and send it for DNA analysis. If this only occurs in a small number of cases, DNA evidence will hardly improve the quality of decision-making at all. Secondly, the quality of each individual DNA test must be assured: this entails not only maintaining the integrity of DNA samples (ensuring that they are not contaminated, mislabelled etc.) but also the testing process itself. The latter concern can be broken down further, to highlight the need for reliable instruments as well as for reliable actors operating the instruments. Thirdly, once a DNA test has been carried out, the information it produces must produce cognitive states which will contribute to good decision-making. The decision-maker must understand the information and be able to combine it with other information she possesses. This means that the factors relating to quality which we have already considered — such as quality assurance — are again relevant, because knowledge that

4 There may be other aspects of quality relating to the use of forensic science in criminal justice contexts. For example, forensic science evidence might be said to be of low quality if it can only be obtained by infringing the privacy of suspects. In order to keep the discussion within manageable bounds, I do not discuss such issues here. Cf. M. Redmayne, The DNA Database: Civil Liberty and Evidentiary Issues, Criminal Law Review 1998, 437, pp. 437-446.
quality assurance procedures are in place may enable the decision-maker to place more weight on the results of the DNA test.

Hopefully, this brief sketch will have brought out the complex nature of quality issues as they relate to forensic science. The remainder of this paper will consist of a more detailed examination of these various aspects of quality. In order to keep the discussion fairly abstract, I shall use as an example an imaginary forensic science technique, $T$, which can be used to analyse trace evidence with the aim of linking the perpetrator to the crime scene.

2 Using forensic science

The criminal process is sequential in nature: decisions made at early stages affect decision-makers 'downstream'. With forensic science, decisions made at the early stages of an investigation will affect the ability of later actors to make good decisions. Turning to our hypothetical technique, $T$, $T$'s contribution to the quality of criminal justice decision-making depends on whether anyone ever decides to use it during the course of an investigation. What factors will affect this decision? The preliminary factor is what we might term $T$'s 'base rate availability' ($BRA$), the number of crimes in which there exist traces which can be analysed using $T$. For most individual forensic science techniques $BRA$ is difficult to discern. Forensic science in general, however, probably has unlimited potential. The Locardian principle ‘every contact leaves a trace’ may perhaps be an exaggeration, but the range of forensic science techniques – for example, analysis of fibres, hair, blood, semen, soil, handwriting, shoe-marks, tool-marks, finger-, ear- and foot-prints, and, with advances in DNA technology, the analysis of single skin cells – suggests that, at a conservative estimate, a forensic science technique (and often more than one) could be used in the investigation of 95 per cent of crimes.

Let us suppose that $T$ has a $BRA$ of ten per cent. That does not of course mean that $T$ will be used in ten per cent of cases: the investigator must decide whether or not to employ $T$; if $T$ is not used in all cases in which it is available, it will have a base rate use ($BRU$) which is less than $BRA$. There is a large number of factors likely to affect $BRU$. Most importantly, the investigator must be aware of the availability of $T$ and its potential contribution to the investigation. This is likely to vary between different techniques: it is hard to imagine that any investigator does not know that traces of blood can provide important information, but how many also


know that the analysis of soil on a suspect’s boots can make a similar contribution? It will also depend on information provided to the investigator during the course of the investigation. In England, research suggests that many police officers have insufficient knowledge of the availability and value of various forensic science techniques. However, this knowledge gap may be filled if a specialist scene of crime officer attends the crime scene, or if the investigator calls on a forensic scientist. Even if all investigators are well informed about $T$, however, there may still be a gap between $BRU$ and $BRA$. The investigator must make a cost/benefit decision concerning the use of $T$. In England, police forces must pay, out of their annual budgets, for each piece of evidence submitted to a forensic science laboratory. ‘Direct charging’ is a fairly recent development, and there are numerous concerns – too many to explore here in detail – about the effect that this has had on various aspects of the quality of forensic science evidence. Even in countries without direct charging, however, investigators are unlikely to use the available forensic science resources without restraint. They will not only be aware that the state will have to bear the cost of profligate use of forensic science, but may also be reluctant to add to their own workload by making decisions about what evidence to send for further analysis and what information to provide to the forensic science laboratory. It is therefore apparent that $BRU$ will be affected, not only by the knowledge of the investigator, but by various characteristics of the case and of police policy. Serious crimes, or those singled out as police priorities, are more likely to result in the use of $T$. Another significant factor will be the investigator’s perception of the need for forensic science evidence in building a strong enough case for her purposes, which will depend on her assessment of other available evidence.

These issues have a significant impact on the overall contribution of $T$ to the quality of decision-making in the criminal process, and are worth dwelling on for a moment. Studies of police investigations have highlighted the fact that the typical investigation does not proceed along the lines of its fictional counterpart – a search for the perpetrator through exacting analysis of evidence. Instead, in most investigations the investigator will have a suspect in mind from the outset: the purpose of further investigation will

---


10 Saulsbury et al., op. cit., pp. 34–35 (‘two of the commonest reasons for not submitting evidence to a laboratory are that a suspect has already been arrested, and that other evidence is available’).
be to build a case against that suspect sufficiently strong to secure his conviction in court.\(^\text{11}\) This ‘case construction’ model means that forensic science will rarely be engaged in order to test the investigative hypothesis: evidence tends to be selected in order to confirm suspicion rather than to eliminate it.\(^\text{12}\) If, however, there is no obvious suspect at the beginning of the investigation, the investigator is likely to determine whether or not to use T by predicting the likelihood of finding a suspect. Absent an offender database, T will not help to link a suspect to a crime unless that suspect can be identified by other means. Unless, therefore, the investigation is of a particularly serious crime, T is unlikely to be employed unless a suspect can be located within the first few days of investigation. The upshot of this is that there will be a significant bias in the use of T. T will tend to be used to confirm suspicions already well founded, rather than to eliminate a suspect against whom there already exists a strong case. The gap between BRA and BRU will consist of a number of situations in which potential use of T might contribute significantly to the ends of the criminal process by disconfirming strong evidence against a suspect.\(^\text{13}\)

The training and attitude of the investigator are likely to affect BRU in another way. Forensic science techniques are coming to focus more and more on the microscopic detail of trace evidence. This means that such evidence is easily overlooked and contaminated; unless a crime scene is handled with extreme care from the moment the investigator arrives, scientists are likely to find their ability to discover useful evidence at the scene diminished.\(^\text{14}\) One should be especially aware of the implications of crime-scene preservation for defendants. If, sometime after the crime, a suspect is arrested, he may wish to have the crime scene analysed for trace evidence. This process may be extremely labour-intensive, because any scientific investigation would be carried out for the purpose of making credible the hypothesis that the defendant was not present. A detailed search of a well-preserved crime scene which reveals no trace evidence linking the defendant to it will not disprove his involvement; it will, however, make it less probable.\(^\text{15}\) This underlines, again, the importance of


\(^\text{12}\) This anti-falsification bias does not appear to be unique to adversarial systems. See the discussion in W. A. Wagenaar, P. J. van Koppen and H.F.M. Crombag, Anchored Narratives: The Psychology of Criminal Evidence, Hemel Hempstead: Harvester Wheatsheaf 1993, pp. 88–93.

\(^\text{13}\) As Ramsay put it: “If given that eyewitnesses can make mistakes, and that police officers can sometimes be misled, the FSS clearly has an intermittent but vital role to play in protecting the innocent, as well as in strengthening the case against those who commit offences.” M. Ramsay, The Effectiveness of the Forensic Science Service, London: HMSO 1987, p. 20.


Chapter IV: Quality

calling professional scientists to the scene to collect, preserve and analyse evidence, rather than leaving decisions to investigators or police officers with inadequate scientific training.

A more subtle point is relevant here. The ethics and role of the forensic scientist is a well-worn topic, but debate has tended to centre on the role of the scientist in court. Yet ethics and role definition are relevant at the crime scene too.\textsuperscript{16} Does the forensic scientist perceive her role as improving the quality of criminal justice decision-making as a whole, or, more narrowly, as aiding the police, with the terms of her investigation set, to a greater or lesser extent, by the police?\textsuperscript{17} There is no easy answer to this question. The police need proactive forensic scientists to help them identify and prove cases against suspects,\textsuperscript{18} and this may involve restricting the scope of the scientist’s inquiry; but the wider ends of the criminal justice system will only be served through maximisation of available forensic science information. BRA remains the criminal justice ideal, but we must accept that, in practice, it is unattainable. But if we want BRU to serve criminal justice ends, we need to find means (such as carefully formulated policies for investigator decision-making at the crime scene) to ensure that police evidentiary and budgetary concerns do not prevent defendants from pursuing relevant lines of inquiry.

3 Into the lab: quality science

Once the initial decision has been made to use $T$ to analyse evidence, different questions about quality are raised, specifically about the discriminatory power and error rate of $T$ itself.\textsuperscript{19} However, we should not lose sight of the fact that $T$ must be applied and interpreted by a human actor whose attitudes and abilities also affect the quality of information produced by $T$.

3.1 Characteristics of forensic science

Writing in 1963, Kirk lamented the failure of forensic science to develop as a science. "[P]rogress has been technical rather than fundamental, practical rather than theoretical, transient rather than permanent."\textsuperscript{20} Thirty-five years later, little seems to have changed.\textsuperscript{21} Although there are fundamental concepts in forensic science – Kirk singled out individualisation as a key

\begin{itemize}
  \item \textsuperscript{17} Sensabaugh, G.F., On the Advancement of Forensic Science and the Role of the University, Science & Justice, 1998, 38, p. 211, 213.
  \item \textsuperscript{18} Stockdale, R., Running with the Hounds, New Law Journal, 1991, p. 772.
  \item \textsuperscript{19} For a general framework for analysing the probative value of forensic science techniques, see M.J. Saks and J.J. Koehler, What DNA Fingerprinting Can Teach the Law About the Rest of Forensic Science, Cardozo Law Review, (1991) 13, p. 361.
  \item \textsuperscript{21} Sensabaugh, op. cit., pp. 211–212.
\end{itemize}
concern – they are poorly understood on a theoretical level. Further, although interesting work has been done on developing universal principles for the interpretation of scientific evidence, some forensic scientists appear suspicious of such new-fangled ideas.

The theoretical stagnation of forensic science is, perhaps, unsurprising. As an applied science, forensic science is concerned with solving practical problems, and those who work on them probably have little time for theoretical musing. What is more, forensic science has no real academic base, nor do most academic scientists take an interest in it, so the science’s practical bent rarely confronts fundamental questions. The isolation of forensic science from the wider scientific community has a further implication. Despite the shortcomings of individual scientists, the scientific community as a whole functions effectively as a means of finding, testing and evaluating significant truths about the world we inhabit. Forensic science, however, does not always benefit from the factors – intense competition, dissemination of ideas, mechanisms of peer review – that keep mainstream science true to its aims. Nor are its customers – criminal process actors – well placed to assess its knowledge claims. Thus it is that some forensic science techniques have managed to escape the scrutiny they would have received had their claims been advanced in and proved of interest to the wider scientific community.

A final notable aspect of forensic science is that many forensic science techniques call for large degrees of subjective judgment. Obvious examples are techniques such as fingerprinting and handwriting identification, but the same is true even of high-tech disciplines such as DNA profiling. This is not a criticism of those techniques, but we should note that an implication of it is that, where techniques rely on subjective judgment rather than

---


26 For the impact that this has had on one particular discipline, see W.C. Thompson, A Sociological Perspective on the Science of Forensic DNA Testing, UC Davis Law Review 1997, 30(1113).

27 For a shocking example, see the Court of Appeal’s assessment of a contested voice identification technique with reference to the fact that its proponent had testified ‘on some 25 occasions, on each of which the court’s decision had been consistent with his opinion.’ Robb, Cr. App. R., 1991, 93, p. 161, 165.


articulable and testable principles, they require careful empirical validation in order to substantiate their proponents' claims.

3.2 Validating forensic science

In England, the validation of forensic science techniques has been left, by and large, as an internal matter for the state-run forensic science laboratories: the Forensic Science Service (FSS). New techniques are developed through the research and development arm of the FSS and are then put into practice within the service. The FSS also institutes various quality assurance procedures, such as peer review of case-work and the submission of mock case-work to laboratories. The laboratories have also gained a degree of external accreditation through NAMAS and BS 5750. Some commentators, however, have called for an external body to play a larger role in the regulation of the forensic science laboratories.

Outside the FSS, however, there is little regulation of the quality of forensic science techniques used, even when the techniques are used by the police. The problems are most marked in fields outside the traditional forensic sciences where techniques of dubious validity have been used by both prosecutors and defendants. It is here that the traditional approach of leaving issues about the quality of science to the courts is most problematic.

The extent to which accreditation and quality assurance — presuming that they are in place — will ensure the validity and reliability of $T$ will depend on the nature of $T$. We noted above that many forensic science techniques involve large degrees of subjective judgment. This means that quality cannot be assured simply by testing the calibration of equipment; instead, only blind testing can confirm whether or not the technique, as applied by its users, is valid and reliable. For some techniques, however, even blind testing is difficult to carry out, because a particular application of $T$ would need to be compared to a situation which cannot easily be simulated. The analysis of blood stain patterns or knife wounds is one example.

30 For criticism of the current state of research within the FSS, see Editorial, To Research or Capitulate?, Science & Justice, 1996, 36(1).
32 NAMAS is the National Measurement Accreditation Service; it organises inspection of laboratories by external assessors to check such things as documentation, calibration, peer review and the results of proficiency tests. For more details, see ibid., pp. 29–30.
33 BS 5750 is a standard for assessing the technical quality of the work of an organisation by checking documentation of procedures and calibration of instruments.
36 For example, the voice identification technique relied upon in Robb, see footnote 27.
With other examples simulation is more feasible, but valid control data may still be hard to come by. Sometimes this may be due to the lack of theoretical insight alluded to earlier. For example, it is only recently that it has been realised that the significance of transfer evidence, such as fibres or glass fragments found on a suspect's clothing, needs to be evaluated with reference to the probability that a transfer would have taken place when the crime in question was committed, and with reference to the presence of non-matching fibres/glass. 38 It is obviously difficult to generate such knowledge and in practice scientists will have to make educated guesses. Control data for such techniques also need to be updated frequently, most obviously in the case of fibre evidence where the validity of databases is, to an extent, hostage to the vagaries of fashion.

These considerations underline the importance of interpretation in forensic science: the process by which the results of the application of T are used to form conclusions about the value of those results in proving what occurred. In recent years, important work has been done on this previously neglected aspect of the scientist's task, clearly demonstrating that sound interpretation is crucial to quality. The most significant conceptual advances in forensic science have been made through the application of Bayesian methods to forensic science problems; 39 that these methods sometimes have produced counter-intuitive results demonstrates their power and value. 40 In some circumstances, adoption of a Bayesian perspective may even increase the amount of information available to investigators. For example, it is traditional for fingerprint examiners in England and Wales to refuse to declare a match unless 16 points of similarity can be found between the prints examined. There is no particular reason for demanding 16 points: it is simply a convention. 41 It is not hard to see that it is odd when 15 points of similarity lead to a 'no-match' conclusion, while 16 points leads to 'match'. There are strong arguments that it would be better to report that any number of points of similarity (and absence of significant dissimilarity) provides evidence of identity, with the strength of evidence varying with the number of points. Such an approach would avoid the information-loss associated with the match/no match approach. 42

The subjective component of forensic science techniques has a further implication for quality assurance. This is that the reliability of techniques can never be assessed in isolation: the competence of the scientists using

39 See, generally, ibid.; Robertson and Vignaux, see footnote 23.
41 It seems, however, that this convention will be abandoned in the near future. See B. Woffinden, Thumbs Down, The Guardian, 12 January 1999.
them must also be evaluated. This is especially important where, as with handwriting identification, the technique in question involves no instrumentation, but simply relies on the skill and experience of the scientist. In England, there are now moves to test the competence of scientists in FSS laboratories on a regular basis. As with quality assurance, however, there are more difficult problems involved in ensuring the competence of others who may offer expert advice to criminal justice actors; again, one cannot expect the consumers of such expertise to be well placed to make judgments about the quality of putative experts. The English criminal process has seen various proposals for the accreditation of experts, and an ambitious plan for accreditation has now been put forward by a government-sponsored working group. Importantly, the proposals recognise the point made in the introduction to this paper—that with respect to forensic science a ‘total process’ view of criminal justice is required—consequently, accreditation will not be reserved for experts giving evidence in court, but will be required of all those involved in the generation of forensic science evidence. Of course, accreditation schemes raise difficult questions about the authority of accreditors. In the proposed scheme, accreditation will be linked to standards endorsed by existing professional bodies. Although some outcomes of the process may be controversial, this is probably a price worth paying for enhancing the quality of expertise used in the criminal process.

3.3 Case-work and quality

The preceding section has examined some of the more abstract aspects of quality assurance in the forensic science laboratory. When it comes to the application of forensic science in actual case-work situations, there are other factors which may affect quality. Most obviously, the quality of any individual application of T will depend on the quality of the evidence submitted to the scientist, and this is an aspect that is more difficult to assess through quality assurance than the basic reliability and validity of the technique. The training of police officers, and their willingness to call out scientists to assist them at crime scenes are factors, discussed earlier, which impinge on controlling quality at this stage. A less obvious factor which has implications for quality is the way in which the issues to be addressed by the forensic scientist are framed by the inves-

47 See ibid., paras 1.21, 6.8–9.
tigator. General psychological research, as well as specific studies of forensic science investigations, present ample evidence that forensic scientists can be biased by evidence which suggests that the traces they are examining 'should' match, because there is other evidence that the suspect is guilty. This might suggest that it would be better to keep the forensic scientist in the dark about the details of the investigation. But such a strategy would have a price, because it would keep potentially relevant information from the scientist and this, too, might affect the quality of her work. For that reason, it seems to be accepted that it is preferable to give scientists access to as much information as possible about the investigation. A corollary of this strategy should, however, be that the information given to the scientist is carefully recorded, so that her opinion can be read in the light of the context in which it was formed.

3.4 Challenging quality
A significant feature of the production of expert evidence in England and Wales is that prosecution expert evidence may be challenged by means of an opinion commissioned from an expert employed by the defence. My impression is that, in inquisitorial systems of justice, this is extremely rare. In such systems, the defence point of view - incorporating both suggested lines of inquiry and criticisms of the state's expert evidence - will be filtered through the office of the investigating judge. This is not the appropriate place to consider the respective merits of the two systems; we should, however, note the implications of defence challenges to expert evidence for the quality of that evidence.

The point to be made is that challenges to expert evidence can contribute to quality in a number of ways. First, they can do so by recontextualising the expert evidence. By taking into account the theory of the case pro-

50 Roberts, see footnote 9, pp. 478–480.
51 This, however, appears to be the exception rather than the rule. See M. Zander and P. Henderson, Crown Court Study, London: HMSO 1993, pp. 86–87.
posed by the defence, the expert evidence may be seen in a new light, and
its value to the prosecution case may be reassessed. Secondly, by uncovering flaws or limitations in the prosecution evidence a defence challenge may operate as a form of case-specific quality assurance. As we saw above, the subjective component of many forensic science techniques results in formal quality assurance processes being poor indicia of their worth. Even those who use the techniques are aware that there is often scope to challenge their evidence, and regard the failure to mount challenges in some cases as problematic. Thirdly, when expert evidence commissioned by the prosecution is regularly challenged by defence experts, prosecution experts may come to be more cautious in the preparation of their evidence as a matter of course, and the techniques they use may change. In this way, challenges in individual cases may have long term effects on quality.

4 Out of the laboratory: quality as a cognitive phenomenon

Once $T$ has been employed, the results of the test must be communicated to other actors in the criminal process so that they can use the information in their decision-making. It is worth re-emphasising two points. First, quality must ultimately be understood in cognitive terms. No matter how reliable or detailed the results of $T$'s application are, its contribution to the criminal process will be negligible unless those results can be understood, relied upon, and used productively by other decision-makers in the criminal process. Secondly, when we consider post-laboratory decision-making, we should not overemphasise the importance of the trial. Forensic science information is used in a number of other decision-making contexts: decisions on whether a series of crimes have a common perpetrator; decisions on whether to charge suspects; decisions on what to charge suspects with; the suspect's decision on whether or not to plead guilty and what to plead guilty to. Though these decisions are far less visible than adjudicative decisions, in criminal justice terms their outcomes may be just as serious.

53 For examples, see R. Stockdale, ‘For Action This Day’, in M. McConville and L. Bridges, see footnote 8, pp. 305–307.
54 Roberts, see footnote 9, pp. 501–502.
55 DNA evidence provides a good example of this process. While noting that ‘the extended debate’ about DNA evidence has been ‘acrimonious’, Evett and Weir conclude that it has also ‘been good for the science.’ I.W. Evett and B.S. Weir, Interpreting DNA Evidence: Statistical Genetics for Forensic Scientists, Sunderland, MA: Sinauer 1998, xiv. A more specific example from the same field is the adoption by the FSS of methods of calculating DNA match probabilities first proposed by statisticians employed by defendants: see P. Donnelly, Discussion of the Paper by Foreman, Smith and Evett, Journal of the Royal Statistical Society, 1997, Series A, p. 460.
57 For this reason, one should be wary of suggestions that lower quality, or less well-tested forensic science evidence may be acceptable outside the adjudicative context. The use of ‘presumptive tests’ for illegal drugs in cases where a defendant pleads guilty, or the use
The results of $T$ must be communicated in clear and meaningful terms, and be accompanied by sufficient background information to enable other decisions-makers to contextualise the results. In England and Wales, there is evidence that forensic science reports are sometimes not well understood. There is a strong case for adopting uniform reporting conventions that criminal justice decision-makers can be trained to understand. Here again, the conceptual framework offered by Bayesianism has a number of merits in that it avoids some common logical fallacies while offering a coherent account of evidential strength. Bayesian presentation of forensic science results need not be dauntingly complex. Evett has suggested an approach whereby likelihood ratios denoting evidence strength in support of a specific hypothesis can be translated into verbal conventions such as 'good' and 'strong' evidence. Because the Bayesian framework establishes an agreed meaning for these terms, they can easily be understood by those who have received some elementary training in Bayesian principles of evidence interpretation.

4.1 Forensic science in court

It is probably in the courtroom that the differences between European and Anglo-American treatment of expert evidence are greatest. In England and Wales, experts, when they appear in court, do so as representatives of the parties. In Europe, court-appointed experts are the norm. Nevertheless, there are, or, at least, should be, common aspects of quality between the systems when it comes to the way expert evidence is presented and evaluated in court. For the purposes of this paper, I have defined quality in terms of the extent to which information produces cognitive states that will contribute to good decision-making, good decision-making being that which discriminates accurately between the innocent and the guilty. As we come to consider quality in the context of adjudicative decision-making, we need to qualify this second definition somewhat. That the trier of fact possesses a cognitive state that happens to make her think that the defendant is guilty when the defendant is in fact guilty is not sufficient for good adjudicative decision-making. The problem is that the convergence between belief and fact might happen more or less by accident. The fact finder's belief in guilt should, in the terms of epistemological theory, be rationally justified. Other aspects of court processes also suggest that
quality is a more complex phenomenon in court than in other parts of the criminal process. For example, Dennis has suggested that trials involve "a process of justification of the verdict to the defendant and to the public at large". In court, decision-making that is merely accurate is not necessarily quality decision-making.

What implications do these points have for expert evidence? Most importantly, I think, they suggest that a judge or juror should only base a decision on expert evidence when he or she has good reasons for believing in the validity and reliability of the evidence. Simply trusting the expert, just because she is an expert, does not constitute a good reason for reliance. The trier of fact (as well as other parties) must be able to evaluate the evidence critically. That this does not always occur has, I believe, led to concerns about expert evidence in both civil law and common law countries. What tools might be used to improve the quality of expert evidence, judged from this perspective? One possibility, which has received support in both common-law and civil law jurisdictions, is that experts should play a more educational role in court, and should not expect judges and jurors simply to defer to their opinions. Important though the educational paradigm is, it is not the whole story. Exclusionary rules of evidence can also play a role. Rules such as the Frye/Daubert rules employed in the United States provide a means of keeping unreliable expert evidence out of the courts. Such rules can also articulate the standards to be expected of forensic science techniques, perhaps overcoming some of the problems caused by the peculiar nature of the forensic science community we noted earlier. For example, Daubert envisions a process of empirical validation of the scientific techniques used as the basis for expert evidence, and this has implications for standards in forensic science. Exclusionary rules of evidence, of course, are a common-law phenomenon. Neverthe-

66 The Frye rule (Frye v. United States 293 F. 1013 (1923)), still applied by some state courts, demands that scientific techniques be 'generally accepted' before they can be admitted in court. Daubert (Daubert v. Merrell Dow Pharmaceuticals, Inc. 113 S. Ct 2786 (1993)) lays down more complex criteria for admissibility, including the testing of techniques, publication and peer review of research, and a consideration of error rates.
67 Saks, see footnote 28.
less, some civil law commentators have suggested that they provide a valuable means of improving the quality of expert evidence. In the absence of exclusionary rules, there are other means by which judges can indicate that certain standards are to be expected of the forensic science evidence presented to them. Damaška has observed that in civil law jurisdictions the reasoned judgment plays some of the roles fulfilled by exclusionary rules in the common law. Judges can, therefore, articulate standards for forensic science evidence by, for example, observing that they will not rely on certain forensic science evidence presented to the Court because there is no evidence of empirical validation, or quality assurance, of the technique on which the evidence is based.

A further aspect of quality at the Court decision-making stage is more familiar from our earlier discussions. Efforts need to be made to convey the probative value of scientific evidence in terms which can be understood by the trier of fact, and in ways which will enable her to combine the expert evidence with other evidence. We noted above the merits of uniform reporting conventions, such as the one proposed by Evett, with which criminal justice decision-makers can be made familiar. Here, civil law countries which do not use juries have certain advantages over common-law jury trials. Because judges are repeat players, it is both feasible and worthwhile to educate them about the interpretation of scientific evidence. Because jurors are one-off decision-makers, it is not so easy to familiarise them with the Bayesian framework. Nevertheless, Evett’s verbal conventions have an intuitive meaning which can probably be grasped by lay people with little difficulty. More serious problems arise where scientific evidence is presented in probabilistic terms, as has been the case with DNA evidence. Research on juror understanding of probabilistic evidence may contribute to providing a solution to this difficult problem.

5 Conclusion

This brief overview of the concept of quality as it relates to forensic science evidence reveals the complex nature of quality. Quality can only be assessed with reference to the ends of the criminal process which, I have argued, should be understood in this context as decision-making based on accurate knowledge of the facts to which the decision relates. Forensic science in general has almost unlimited potential to contribute to this end.

68 Crombag, see footnote 63, pp. 85–86. Crombag suggests that the Frye rule provides a means of validly ‘anchoring’ expert evidence.


When we think about quality in relation to forensic science evidence, therefore, we should focus on the reasons why forensic science may not make its full contribution. Some of these reasons relate to decisions made by actors in the criminal process: decisions about whether to use forensic science, what techniques to use, how to ensure the integrity of the crime scene, and so forth. But other reasons why forensic science has untapped potential concern the way in which forensic science information is processed by decision-makers.

In conclusion, it is worth highlighting ways in which the main theme of this volume — harmonisation in forensic expertise — might overlap with the concern to improve quality in relation to forensic science. I would like to highlight two areas where inter-jurisdictional collaboration might contribute to improvements in quality. The first is in bringing new thinking to bear on initial decisions on whether or not to use forensic science in police investigations. By pooling information from different jurisdictions, decision-makers might be made aware of the ways in which contingent policy factors — such as, in England and Wales, the training of police officers and budgetary concerns — affect their use of forensic science. Seeing how things are done elsewhere might bring new thinking to bear on local policies of forensic science usage.

Secondly, we noted some of the features which distinguish forensic science from science more generally, in particular its lack of academic base and concomitant theoretical under-development. Questions relating to the reliability and validity of forensic science techniques are obviously of international concern, as are questions relating to the interpretation of results produced by them. It seems that here, too, much could be gained by pooling knowledge and by spreading the load of the necessary theoretical work. Perhaps a case can be made for establishing a European Institute of Forensic Science.

References


Caddy, B., Assessment and Implications of Centrifuge Contamination in the Trace Explosive Section of the Forensic Explosives Laboratory at Fort Halstead, Cm 3491, London: The Stationery Office 1996.


Quality and Forensic Science Evidence: An Overview — Mike Redmayne


Chapter IV: Quality


3 A Taxonomy of Error and Deviance

Ian Freckelton

Scientific error has been revealed as contributing to a worrying degree to the incidence of miscarriages of justice over the past 20 years in the United States, the United Kingdom and Australia. Error, though, is not univari-ate. It can be deliberate or inadvertent. Poor, as opposed to dishonest, science can affect the reliability of testing (such as by arriving at nonreproducible results) or the validity of testing, leading to the wrong interpretation of test results. For the hapless victim of the end product, it is of little consequence. What matters for them is that by reason of the abandonment of the core values of scientific investigation and analysis, the wrong result has ensued.

This article utilises the categorisation of scientific fraud by Babbage1 and applies it to deliberate error on the part of forensic scientists. It also analyses the commission of error by poor practice, defective methodology and outright sloppiness by forensic scientists. It provides short illustrations of such flaws in an attempt to contextualise them within the phenomenon of scientific error, as well as within the practice of forensic science, in order to understand them better.

The chapter argues that the aetiology of error in forensic science is complex. However, it locates a significant source of error in the creation and maintenance of cultures which do not adequately esteem objectivity and independence amongst forensic scientists. It maintains that as a safeguard against mistakes and frauds in forensic science the law and lawyers have been depressingly ineffective. It asserts that court-generated measures to address defects in the culture within some government-run and funded scientific laboratories are a helpful initiative. However, it argues that more is needed to secure the accountability of those working within such institutions. Building upon the effective work of the Office of the Inspector General in the United States when it investigated the FBI Laboratory in 1996/97, it contends that what is required is the ongoing involvement in each jurisdiction of a body external to public or private forensic science laboratories. The body should possess a charter, and power, to call for

---

files, tests and laboratory notes to monitor the performance of scientists and adherence to prescribed protocols and methodologies.

1 Miscarriages caused by forensic science

Miscarriages of justice by reason of flawed forensic science can occur by deliberate misrepresentation of testing results (including suppression of results inconsistent with the guilt of a suspect), fabrication of test results, and mendacious misreporting of them. Miscarriages can also occur in the context of erroneous, but honest, science and testimony. Classification of error as ingenuous or disingenuous can be highly problematical and on occasion unrewarding. Error is proclaimed by many, and convincingly, as the stuff of science, not as an extrinsic feature, but as a common and necessary risk associated with the conduct of science. Often it is untenable assumptions and irreproducible initial experiments that are of initial heuristic value to scientists, stimulating and guiding the direction of future work.

The reasons why both deliberate and inadvertent error occur overlap with each other to some degree but remain conceptually different. This chapter attempts to disentangle them. It is acknowledged, though, that factors as difficult to identify and categorise as complacency, lack of skill, disinterest, taking of short-cuts, and workplace disillusionment can all play a role in the end-product of flawed scientific evidence. However, the cases to which reference is made in this chapter, and which have generated most concern as examples of error in forensic science, are characterised not so much by ineptitude or human error as by the product of bias and outright fraud.

2 Scientific deviance

The British mathematician Charles Babbage as long ago as the 1830s helpfully categorised scientific deviance, defined by him in terms of deliberate falsification of results, into three categories. They have relevance for the same phenomenon within the context of forensic science: 'forging', or falsification, namely the recording of results that never occurred; 'trimming', manipulating data so that the results either support or at least do

---


3 See, for instance, F. Grinnell, The Scientific Attitude, New York: Guilford Press 1992, 2nd ed. at p. 112.
not contradict a theory; and 'cooking', reporting selectively.\(^4\) He also added the phenomenon of 'hoaxing',\(^5\) while Ben-Yehuda has since suggested the additional categories of 'plagiarism'\(^6\) and 'unethical behaviour', such as conducting 'unauthorised experimentation'.\(^7\) Zuckerman has also argued that 'self-eponymization', such as naming a scientific law after oneself or 'underacknowledgment' of collaborators contributions should be regarded as other forms of fraud.\(^8\)

More latterly the Commission of Research Integrity created as part of the United States National Institutes of Health Revitalization Act 1993 proposed a new definition of scientific misconduct.\(^9\) It continues to incorporate the core of Babbage's distinctions: "significant misbehaviour that improperly appropriates intellectual property or contributions of others, that intentionally impedes the progress of research, or that risks corrupting the scientific record or compromising the integrity of scientific practices".\(^10\) Rather than relying upon previously accepted categories of misconduct, the Commission proposed differently formulated categories: 'misapprop-
Chapter IV: Quality

priation’, including plagiarism as well as peer reviewers’ unauthorised use of confidential information; ‘interference’, occurring when a researcher physically takes or damages the writing or materials of another investigator; and ‘misrepresentation’, taking place when there is falsification and fabrication, but also omissions from research reports which would render them false."

3 Aetiology of deviance and error

All such examples of deviance arise out of a repudiation of, or at least a failure to conform to, traditional values of scientific process and independence. These have been classified and elaborated by many. A useful formulation, though, was that advanced by Merton in 1968 who defined the institutional goal of science as “the extension of certified knowledge”. He identified four norms central to the pursuit: universalism, that is to say that the validity and truth of scientific statements be totally separated from the personal characteristics of the scientist; communality, that is to say that scientific findings should be freely shared with others; disinterestedness, that is to say that the scientist’s research be guided by other than personal motives but by the wish to extend scientific knowledge; and organised scepticism, that is to say that scientists be encouraged to examine openly, honestly and publicly each others’ work critically. Each of these norms must be recognised as an ideal impossible of absolute achievement. Nevertheless, they do identify core values embraced by most within the mainstream scientific community and have the potential, if adhered to with rigour, to impose a substantial check upon scientific error.

A mythology in relation to the conduct of science and in relation to scientific progress can cloud the realities, however. Science, both in its research aspects and in its practical application, is a pragmatic, empirical phenomenon. Consistently, it is characterised by trial and error in which a search is undertaken for what works best in a given scenario or sample matrix, be it researching a new means of forensic paint analysis or of interpreting contaminated DNA data. Not only this, but individual scientists do not exist within a social vacuum. Each is seeking too for progress in his or her own work and for the recognition that can flow from acceptance of the success of their testing or experimentation, and their interpretation of the results. In the process, the scientist becomes an advocate for their work, employ-

11 Ibid.
ing rhetorical devices to emphasise the quality of their adherence to the ideal of scientific method, to highlight the consistency of their approach with orthodox scientific theory and yet the significance of the individual scientist's technique and results. This is particularly to the fore in the realm of forensic science.

 Nonetheless, as a yardstick, albeit an aspirational, rather than a pragmatic one, Merton's analysis has considerable application for forensic science. Absent any of the elements of the Merton road toward scientific integrity, a risk of error becomes apparent. Where the personal circumstances or pressures weighing upon a forensic scientist, at the hands of police investigators or others, impact upon testing or reporting, the potential for error becomes significant. If a closed shop evolves, in which a siege mentality, frustrated at the imposition of legal rules and technicalities, impedes independent scrutiny by peers of forensic scientists' methodologies, protocols and outcomes, the preconditions for skewed work practices are formed. The notion of disinterestedness is closely aligned with the principles of objectivity and impartiality which should be the touchstones of good forensic scientific practice. Adherence to 'organised scepticism' requires work processes involving the application of not just ongoing skill but self-reflection that repudiates, or at least openly acknowledges, preconceptions. It encompasses the use of safety mechanisms such as controls, appropriate supervision and auditing.

The workaday implementation of the null hypothesis in testing procedures and the adoption of a routine attitude of distrust of findings, until reliable data and sound drawing of inferences give adequate ground to dispel the distrust, characterise forensic science unlikely to produce more than occasional human errors. To this extent science has self-correcting mechanisms, as long as they are continually applied. By contrast, scientific error readily arises out of 'bias' in favour of a starting hypothesis, born of habit, expectation or succumbing to unrecognised pressures to find a certain class of results. Such bias can have an impact upon interpretation of findings, observation of results and, in its extreme form, can be manifest in deliberate fabrication.

---

13 One of the classic self-corrections accomplished by science was in relation to the much feted discovery by Blondlot of 'N-rays', in 1903 in the immediate aftermath of the discovery of x-rays by Roentgen and radioactivity by Bequerel in 1896. When he attempted to replicate his proof for a visiting United States physicist, the physicist doubted the legitimacy of the exercise and removed a key part of the apparatus. When the experiment allegedly proceeded toward success, Wood was so offended by the process that he published his account of what he had seen, thereby forever discrediting the previously lauded notion of N-rays.

Workplace dynamics which are such as to erode objectivity, lead to a culture of partiality, and forge too close a relationship between the providers and the consumers of forensic scientific services are likely to lead to a breach of most, if not all, of Merton's norms. The essence of such dynamics is an impairment of objectivity, the single most effective bulwark against scientific error. Protections lie within the core of sound scientific method, constant rigour by laboratory managers in terms of enforcing sound scientific practices and protocols, and regulating those forces which can erode the forensic scientist's independence. Of course, there is no substitute for high levels of skill and commitment within laboratories — the absence or deterioration of such factors should also be monitored and dealt with by laboratory managers lest they corrode the culture within the laboratory.

4 Cultural factors prone to erode independence

A series of English cases, from those involving the discredited Home Office scientist, Dr Clift, to the infamous IRA cases, has highlighted the potential for forensic scientists to become imbued with a prosecution mentality and to make publicly available only those aspects of their work or those interpretations of their results which are consistent with the guilt of a suspect. The cases demonstrate more than poor scientific work and more than inadequate administration within government laboratories. They show a culture within a number of government providers of forensic science services to police investigators that has failed properly to value independence and objectivity.

The reality is that most forensic laboratories are affiliated in some way with criminal investigative or prosecutorial agencies. Within such an environment, with one, or predominantly one, source of referral work there is a serious risk that scientists will be suborned ideologically to the ethos of catching 'crooks' and proving the guilt of suspects. The closer the contact between forensic scientists and the investigators or prosecutors on an ongoing basis, particularly representatives of homicide, major crime and sex offender detection units, the more exposed they are to the pressures (be they direct or indirect, spoken or unspoken) of the police and the prosecu-
tion. The more likely then that the forensic scientists will perceive themselves as having primary obligations to the investigators rather than the investigation and to the prosecution rather than to the courts. This can result in a series of related phenomena:

- a preparedness to express opinions beyond the valid inferences of existing data or methodology, the result being a statement of personal belief or suspicion, inappropriately disguised as scientific inference;
- a preparedness to bend processes to achieve results desired by those investigating crimes or those attempting to prove them in the courts;
- a tendency to interpret test results in the way most favourable to investigators’ and prosecutors’ suspicions in respect of a particular suspect;
- a disinclination to disclose test results or investigation results that are inconsistent with the hypotheses of investigators or prosecutors; and
- the development of an ‘us and them’ mentality between ‘prosecution scientists’, on the one hand, and ‘defence scientists’ and defence lawyers on the other.

What has the potential to ensue from the coincidence of employment by a client source is not necessarily pernicious, though

“No ineluctable correlation exists between a forensic scientist’s bread and butter employment and his or her dedication to maintaining scientific standards of objectivity. But institutional bias is a meddlesome concern that just will not vanish nor should it be downplayed. [I]n the forensic science [it] is manifested by the policies, programs, or practices of an agency, an organization or a group, whether public or private, or any of its personnel which benefit or promote the interests of one side in a courtroom dispute, while either denying or minimizing the interests of the other side. These policies or practices can be intentional or unintentional, de jure or de facto.”

The English Court of Appeal termed the potential for forensic scientists to ‘become partisan’ as a well-recognised risk, a potential consequence of the development of undue affiliation between scientists and the prosecution process:

“The very fact that the police seek their assistance may create a relationship between the police and the forensic scientists. And the adversarial character of proceedings tend to promote this process. Forensic scientists employed by the government may come to see their function as helping the police. They may lose their objectivity.”

19 Ward v The Queen (1993) 96 Cr App R 1 at p. 51.
Chapter IV: Quality

The issues that arise from the relationship and the potential for adverse repercussions to flow from it are whether the problematic aspects of the relationship can realistically be sundered or whether there are institutional measures that can effectively be taken to protect and nurture the independence of forensic scientists. Other questions that arise are whether the legal system is or could be in an adequate position to deal with such aberrations.

5 Role of expectation

Expectation can lead to self-deception and self-deception to the potential to believe too readily, to be deceived. Notorious scientific hoaxes, such as the fraudulent construction in 1912 of the Piltdown Man and Blondlot's N-rays, observed by at least 40 people and analysed in some 300 papers by 100 scientists and doctors between 1903 and 1906, are testimony to scientists' (and others') preparedness to believe what they want to believe. It is the recognition of the dangerous effect of experimenter expectation that has resulted in double-blind experiments, in which neither doctor nor patients know whether a patient is receiving a test drug or a placebo, have become standard in medical research.

One of the difficulties that accompanies the fact that forensic scientists working in state-funded laboratories do work exclusively or almost exclusively for police clients is that the task set for them by their clients is consistently to advise whether, as the investigators anticipate, samples will match. There is an investigative expectation that they will. This can readily be passed on — explicitly or by osmosis to the forensic scientist in the particular case, or by practice and habit in cases generally. Investigators after all, in days of policing efficiencies, user-pays services, and limited resources, are not permitted to avail themselves of the services of forensic scientists on a fishing expedition or on a whim. They do so where they have reasonable cause to believe that the testing will yield a result which will further an investigation or particular focus of an investigation. They know this, and so do forensic scientists. The Court of Appeal in England has recognised the risks, warning scientists not to fall into the trap of the 'prosecutor's fallacy', namely confusing 'the match probability' that an innocent person would match the NCA sample from the crime scene, a matter upon which they are entitled to act as experts, with the 'likelihood


ratio’ which is the probability that the matching individual before the Court is innocent, a matter for the jury.  

The difficulty is that these realities and habits can lead to dangerous work practices, in particular assumptions and expectations which can produce both human error, and in extreme cases, provide a catalyst for deliberate error, namely ‘forging’, ‘trimming’ or ‘cooking’. Where any scientific experimenter expects that their hypothesis will be demonstrated by the results of an experiment, he or she has a tendency to commit errors of interpretation in favour of the expectation. These consist in wrongly identifying results consistent with the hypothesis and in ignoring or overlooking results inconsistent with the hypothesis. Where this is done deliberately, it would amount to ‘trimming’ or ‘cooking’.

6 Error in science

Error in science, however, is by no means an unusual phenomenon. Nobel Laureate Robert Millikan, for instance, omitted data that would have changed the interpretation of his oil-drop experiments; Bernoulli, the mathematician who refined calculus, plagiarised his son’s work and back-dated his publications to cover it up; Galileo exaggerated the outcome of experimental results; Newton enhanced his results to make them more persuasive and a significant cloud continues to hang over the results of Mendel. Going even further back, Ptolemy claimed to have performed astronomical measurements which he had not done.

Foster and Huber have observed that substantial percentages of scientific reports are wrong, commenting that, “Scientists, like other people, are frequently overconfident in their work. The much praised reliability of

---

science occurs only in the long term; in the short term, science is as flawed, as error-prone, and as subject to manipulations and intellectual passions as any other human activity". There can be a tendency for scientists to mythologise their results, to become overly invested in their results, enraptured by the potentially beneficial outcomes of their research. Many other factors too can generate inappropriate procedures and questionable interpretation of results. Mills in 1993, for instance, identified the propensity of many experimenters to 'torture data', to manipulate figures or engage in post hoc interpretation of test results to arrive at interpretations which are interesting or apparently significant. The risk in such a process is that results which are unsurprising or confirmatory of scientific orthodoxy will be glossed over and a dubious complexion opportunistically placed upon results that can be portrayed as providing new insights or perspectives. Such abuses are not easily exposed by reviewers and referees.

7 Personal factors prone to erode independence

Aside from the systemic dynamics that can erode independence and objectivity amongst forensic scientists, there are also more personal pressures, inducements and stresses. In forensic science, as in other areas of science, a range of factors can lead to unethical workmanship. Science is a crucible within which its actors strive for description and understanding of the natural world through passive observations, active experiments and theoretical analysis and synthesis. But within the crucible scientists also seek to achieve recognition for their insights. Incompatibilities between the two goals can readily spawn improper behaviour. The temptations of accelerated professional advancement, as well as of securing professional prominence, the wish to persuade refractory colleagues of a theory the scientist is convinced is right, regardless of laboratory results, pressures of the workplace to meet objectives set by management and clients, and the imperative to process cases with ever greater throughput and efficiency can create temptations to take shortcuts, and thus the potential for error and

even fabrication. In addition, there can be a need to generate research funding by high profile results. This is a factor prominent in forensic laboratories with a high profile and a significant emphasis on research and development.

While there have always been pecuniary encouragements for scientists to produce results, the dynamics focussing the inducements are different in the twenty-first century than when Galileo was supported by the private funds of the Grand Duke of Tuscany and Sir Isaac Newton by Prince George of Denmark. Nevertheless, there has been a continuity of scientists who have buckled under the pressures. Science is littered with examples of practitioners who sought kudos at the expense of adherence to scientific method – out of an ambition for recognition, fame and financial reward.

The desire for ascent to the status of the highly lauded amongst practitioners has long been recognised as a risk factor in terms of generating scientific error. Broad and Wade make the important point that, while science can be described as a ‘community’, it is also a ‘celebrity system’. The way in which it functions fosters the production of an elite in which prestige comes not just on the merits of work but also because of scientists’ position in the professional hierarchy: “Like the paper factories of the lab chiefs, the celebrity system favors the search for personal glory over the search for truth. It also interferes with the normal mechanisms for communal evaluation of results, because it gives undue prominence and immortality to results of the elite”. Lundberg as long ago as 1929 observed that a ‘scientist’s greed for applause’ may become greater than their devotion to truth. Few of the scientists whose names have become household names have been shrinking violets. Newton, Descartes, Leibnitz, Pascal, Lister, Faraday, Davey, to name a few, were aggressive in their efforts to ensure that their discoveries were brought to public recognition. When efforts at self-promotion reach a certain point, they can cross the line into deliberate misrepresentation.

Just as it may be personally advantageous, in the sense of promoting career aspirations, for police detectives to secure a conviction in a high profile prosecution, important participation in assembling evidence against a by then notorious suspect has long had the potential to lead to advancement for forensic scientists and, of course, for considerable ego gratification.

36 Braunwald comments too that because scientific fraud is so detrimental to self, to colleagues, to institutions and to science as a whole, ‘I believe that it is a form of unconscious self-destructive behavior, with aggressive components directed also toward colleagues, supervisors, institutions and society, all of whom are profoundly affected’, E. Braunwald, ‘Cardiology: The John Darsee Experience’, in D.J. Miller and M. Hersen, Research Fraud in the Behavioral and Biomedical Sciences, New York: John Wiley 1992, p. 76.
39 Merton, R.K., Behavior Patterns of Scientists, American Scientist, 1969, 57(1).
More than police, forensic scientists, when writing reports or giving evidence, are putting their professional credentials and credibility on the line. This means that the potential for egos to play a role in the conduct of scientific investigations, the authoring of expert reports and the expressing of forensic opinions is of a high order. In many countries, this phenomenon has been significant in practice with the development of a real cult of personality amongst well-known forensic scientists, pathologists and physicians. The potential for acquisition of a high public profile of itself attracts and challenges the egos of the participants.

From Bernard Spilsbury onwards forensic scientists and doctors have figured prominently in the media. Reputations have been made, fortunes amassed, professional prestige acquired by the exercise of often extroverted and high-handed forensic experts. Breakthroughs in cases of violence that have aroused public revulsion have elicited waves of popular gratitude and adulation for those wielding the tools of the forensic science investigator. For the less stellar looking on at such waves of public sentiment, the temptation to emulate the success of the best known within the profession has been understandably significant; for those at the pinnacle of their profession too the temptation to continue to elicit peer respect and public adulation has on occasion prompted improper practice and even fabrication of scientific results.

Protection against scientific error and fraud within the forensic context, as well as elsewhere in science, lies within the core of sound scientific method. The procedures of the courts and the skills of examiners potentially function as a check, but the key lies within scientific practice and culture within government laboratories. As Ben-Yehuda has put it, deliberate deviance in science is most prone to occur when social control is weak.

Applying Matza's social control theories to forensic scientists, it is probably when a forensic scientist disengages from the constraints of traditional scientific method, or becomes cynical of the ethics and morals of science, perhaps frustrated at the inability to prove guilt where investigators have no doubt of a suspect's having committed a crime, and is supported by an environment which gives succour to a deviant morality, that impropriety

---

41 In Australia, this was a prominent factor in the demise and deregistration of the prominent Dr William McBride, discoverer of the adverse effects of Thalidomide: see B. Nicol, McBride: Behind the Myth, ABC Books 1989; compare W. McBride, Killing the Messenger, Sydney: Eldorado 1994. See also the 'Baltimore affair' in which the Nobel Prize-winning David Buchanan co-authored a paper with false data but persistently, in the end at the cost of his career, refused to re-examine his data: see R. Bell, Impure Science: Fraud, Compromise and Political Influence in Scientific Research, New York: John Wiley 1992, p. 113 ff.
will be committed – when a ‘drift situation’ will translate into positive de-

8 Going beyond expertise

When scientists express opinions under cover of their expert status which are beyond the parameters of expertise, what is being done is a covert enunciation of personal opinion of suspicion. The difficulty is that such opinions are given under the often impressive banner of ‘scientific evidence’. Few trial lawyers are skilled or knowledgeable enough to make forensic scientists properly accountable for such opinions.44 Their performance in this regard, when viewed against the miscarriages of justice referred to in these pages, is not encouraging.45

Frequently such an opinion or suspicion will be the product of information provided by investigators or the result of the pressures of public sentiment. Wasyliw, Cavanaugh and Rogers have made the point well:

“There is no objection to forensic experts making statements of in-

formed and concerned opinion on important issues. It is rather the lack of differentiation between legitimate scientific deduction and personal value judgment, which constitutes a critical vulnerability of the scientist as an expert witness, and which, in one manner or another, has added to much of current criticism.”46

Such scientific impoverishment is a product of both inadequate subscrip-
tion to standard scientific principles and the desire for self-aggran-
disement, an understandable but unacceptable human failing when the cost may be the life or the wrongful imprisonment of an accused person.

9 Bending of the rules

A considerable literature has explored the factors that lead to ‘bending of the rules’ within police forces, to the ‘Dirty Harry’ mentality where the end
is perceived as justifying the means. Many of the same dynamics that lead to well-intentioned and initially honourable police turning a blind eye to corruption amongst their colleagues, fabricating evidence against suspects and even themselves taking bribes is relevant in the context of those who come to perceive themselves working in a support role to police. A range of motives and dynamics are at work and may be identified in the cases of such behaviour amongst forensic scientists which have come to public attention. They range through worker burn-out, frustration at the technicalities within legal rules, an ‘us and them’ attitude toward defence lawyers in criminal trials, and a sympathy for victims that corrodes adherence to scientific protocols.

10 Forensic pressures

The pressures upon investigators to produce results, as indicated previously, can readily be passed on to the scientists enlisted to assist them. Similar dynamics weigh upon scientists dragooned to assist the defence in criminal matters. Their task, as well as that of rebuttal scientists called for the prosecution, is often to review the methodology, interpretative criteria and professional pedigree of opposing scientists. The focus is upon the search for error, and in such an orientation there is a ready tendency to be hypercritical – to overstate minor aspects of questionable approach and to extrapolate it to the results generally or the methodologies employed throughout. The reviewer can easily succumb to the temptation to engage in what Foster and Huber have termed ‘data dredging’: “The circumstances of a trial call for a selective interpretation of data, post hoc, and by their very nature encourage a lack of objectivity on the part of the expert. The legal system expects litigants to dredge their data, but that practice corrodes scientific objectivity and rewards grossly erroneous conclusions by scientists in court”.

11 Forging, cooking and trimming results

A disturbing number of forensic scientists have been exposed as having falsified test results and having been prepared to lie under oath. This is the extreme end of impropriety in forensic science. It is a rare but deeply worrying phenomenon. The more that can be understood about it, the better the forensic science community and the legal profession can combine to guard against it.


An important point that must be made is that the phenomenon is not particular to forensic science. There have been many notorious examples of utter fabrication of results.\textsuperscript{50} Recent examples of fraud paint a consistent picture. In the non-existent chemistry testing of Fred Zain,\textsuperscript{51} the fake autopsies of Ralph Erdmann\textsuperscript{52} and the spurious reports of Special Agent Curran of the FBI Laboratory,\textsuperscript{53} for instance, a complex interplay of motives appears to have generated the fabrication. However, while pecuniary and status advantages may have been a factor in the scientists' behaviour, an ideological adherence to assisting prosecution cases appears to have been the driving impetus.

Examples of suppression of results inconsistent with the hypothesis being explored in the course of scientific testing have already been given in the context of the IRA cases where test data were consistently manipulated by forensic scientists so that they supported the hypotheses of the investigators.\textsuperscript{54} This is a key form of 'cooking', in the sense that the term was employed by Babbage.

12 Responses to demonstrated fraud

Understandably, but unjustifiably, science has too many examples of supervisors who have taken inadequate steps too late in response to clear evidence of scientific misconduct. The problem is by no means confined to the forensic area. It is a generic disinclination to believe the worst of colleagues, to acknowledge deficits in supervision that could have allowed fraud to foster, to grapple with a scandal that could prove highly embarrassing for an institution and to expend the time and resources upon allegations of dishonesty. A similar disinclination to initiate effective review and response has characterised the evolving evidence for misconduct in forensic science and misconduct. This was particularly apparent in the unsatisfactory response of the FBI Laboratory to serious allegations of scientific misconduct during the early 1990s.

\begin{footnotesize}
\begin{enumerate}
\item\textsuperscript{51} Hansen, M., Lab Evidence Questioned, \textit{American Bar Association Journal}, July 1994, 80(16).
\item\textsuperscript{52} Ibid.
\item\textsuperscript{53} Ibid.
\end{enumerate}
\end{footnotesize}
It has consistently been claimed by forensic science laboratories that the aberrations of the IRA cases, of miscarriages of justice such as Chamberlain, Splatt, Peden and Rendell in Australia, and the excesses of Zains, Erdmanns, Robbins and others in the United States have been eliminated by the introduction of credentialling, improved protocols and better peer scrutiny. These claims were explored in a very practical and disturbing way in relation to the high profile FBI Laboratory in the mid-1990s. What was uncovered by an investigation by the Office of the Inspector-General (OIG) into the claims of a whistle-blower about certain sections of the FBI Laboratory in which he had experience gives cause for substantial ongoing international concern about the potential for systems failures when problems become manifest in forensic scientists' performance.

The OIG report did not just recommend the 'reassignment' of a series of senior staff and a number of key procedural and methodological changes to practices within the Laboratory. The report identified a grossly inadequate set of responses by the Laboratory to the whistle-blower's expression of legitimate concerns about his predecessor, one Rudolph, and to the complaints of an Assistant United States Attorney. Amongst them was a report by the chief of the Chemistry/Toxicology Unit. This was subsequently found by the OIG to be "seriously deficient, that he failed to engage in the type of technical review that would actually have assessed the competence and sufficiency of the work purportedly performed". This was followed by a further defective internal investigation and then after 6 years by an investigation by the chief of the Material Analysis Unit, which found flaws so serious that he recommended that Rudolph be disciplined and removed from doing any further explosives work within the Laboratory. Yet another review was then commissioned by the supervisor of the chief of the Material Analysis Unit. Once again it found serious deficiencies in the work of Rudolph. It led to advice that he be seriously reprimanded. Instead the Laboratory Director merely orally admonished Rudolph and at the same time gave him a cheque for $US 500 which represented an incentive payment for recent work.

The series of reports into Rudolph's work tell a tale first of investigative incompetence and preparedness to whitewash and then of disinclination amongst those at high levels within the FBI Laboratory to take unequivocal and prompt measures to remove from within the Laboratory a scientist whose work was clearly of an unacceptable standard. A substantial portion of the investigations and of the response to them betrayed a culture that was conducive to scientific work of a defective standard and also of an institutional opposition to auditing itself rigorously and objectively. It was a

perfect environment for scientific error, in favour of the prosecution in criminal trials, and for scientific fraud, to flourish.

13 Protections against fraud and error in forensic science

A bulwark against both error and fabrication of results within forensic laboratories, as within science generally, is a sound system of supervision, review and peer assessment of results to ensure both capacity for replication and validity. It has to be acknowledged, though, that the efficacy of such processes to function as an effective check upon scientific misconduct has been hotly debated during the 1990s with critics claiming that peer reviewing and attempts at replication too often are infected also by the making of assumptions in respect of the former by an unwillingness to accept new ideas.

In the United States, standards for toxicology and drug studies are enforced by the Food and Drug Administration, the Environmental Protection Agency and others by guidelines such as Good Laboratory Practices and Good Clinical Practices, both of which are designed to secure integrity of data and accountability of testing processes. They are indicative of a concerted attempt to give teeth to regulatory agencies beyond the articulation of best practices, quality control and sound standards. However, even the entrenchment of such forms of protection have their limitations. The 1992 joint report of the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine acknowledges this, conceding that, “although mechanisms of self-correction may expose false claims, 56

---

56 See e.g. W.J. Broad and N. Wade, Betrayals of the Truth: Fraud and Deceit in the Halls of Science, New York: Simon and Schuster 1982; S. Lock, Does Editorial Peer Review Work?, Annals of Internal Medicine, July 1994, 121(600; E. Altman, 'Misconduct and the Scholarly Literature', in E. Altman and P. Hermon (ed.), Research Misconduct: Issues, Implications and Strategies, Greenwich: Ablex 1997; M.C. LaFollette, Stealing into Print: Fraud, Plagiarism and Misconduct in Scientific Publishing, Berkeley: University of California Press 1992, p. 5; A. Poling, ‘The Consequences of Fraud’, in D.J. Miller and M. Hersen, Research Fraud in the Behavioral and Biomedical Sciences, New York: John Wiley 1992 at p. 145: “Although replication is often touted as a means of detecting fraud, it is not. The reasons for this are three. First, a researcher can present data that, although fabricated, portray a relationship that legitimate researchers can reproduce. Second, direct (i.e. exact) replication is relatively rare in science, unless the original findings are either of remarkable clinical or theoretical significance, or are highly anomalous in light of current theories. And, if replication is not exact, it is difficult to determine what is responsible for a failure to replicate.” Herron asserted that both reviewers and journal readers ‘must recognise that the peer-reviewing process can only determine, for instance, that: data are reported in a consistent manner; findings are consistent with what is already known, or appear logical ...; conclusions are based on the data; appropriate statistical tests are applied; numbers and percentages are consistently and correctly reported; study objectives, research questions, and hypotheses are clearly worded and addressed in a coherent and logical manner; and that sufficient information is provided to replicate in part the experiment’: P. Herron, ‘Misconduct: Coping with the Problem’, in E. Altman and P. Hermon (ed.), Research Misconduct: Issues, Implications and Strategies, Greenwich: Ablex 1997, pp. 98–99.
they are not designed to detect or deter misconduct in science". However, there is no reason to become despairing or nihilist. It is true that those malicious enough to engage in premeditated falsifications may beat the system some of the time, but if a climate is created by guidelines which demonises error and poor practice and conduces to workplace values which repudiate inappropriate assumptions and partisanship, that will be a significant step in the right direction. But more is necessary in terms of the culture within laboratories as manifested in protocols, methodologies, peer review systems, accreditation processes and responses in face of personnel deviance.

There is a need for systems to be in place to lessen the likelihood of deviance, to affirm traditional principles of scientific objectivity, to consolidate a culture of integrity, detachment and independence. In addition, a public message for the forensic community must be articulated robustly and promptly in face of proven misconduct to ensure that deterrence of those who snub scientific principles is assertively embraced.

It is unrealistic for most jurisdictions to contemplate the establishment of laboratories completely separate from police forces. Even if they did, only so much would be achieved. Police investigators would remain the overwhelmingly principal clients of any state-funded government laboratory. This fact in itself is what is most likely to engender the kinds of temptations and biases that have been described in this chapter. The most that can be accomplished is continuing consciousness of the potential for error and deviancy, as historically demonstrated, by reason of the sameness of the work likely to be undertaken by forensic scientists and of the dynamics involved in the production of their work product. Allied to this, high level accreditation processes, together with regular, and unpredictable, auditing of both results and methodologies serve to set in train processes with a reasonable prospect of success in uncovering practices of the kind so notably exposed in the OIG inquiry. Ongoing sensitisation to the many ethical dilemmas that can pervade the practice of forensic science may also be a useful initiative. In this regard bioethicists and experienced scientists may have much to offer in terms of highlighting issues that can otherwise go unnoticed or unacknowledged.

Thus, the response required is one within the bailiwick of laboratories but also within that of the legal system generally. The affirmation of a cultural norm within forensic science that prizes first and foremost adherence to


scientific objectivity and neutrality can be facilitated by the law, as well as by laboratory managers. A series of English decisions has endorsed a code of ethics for expert witnesses. Its primary focus, although not its only one, is to avoid partisanship and its consequences. Lord Woolf, too, in his 1996 report on Access to Justice argued that articulation of such responsibilities and duties would be welcomed by experts as a recognition of their role as ‘advisers to the Court rather than advocates of the parties’. The Academy of Experts in England responded by prescribing that its members should include such a declaration between the end of an expert’s report and the affixation of their signature to it. The primary aim of the declaration was to promote the independence of the expert witness from the party calling them. To a similar end, the Australian Federal Court in September 1998 issued a ‘Practice Direction’ which articulated the desirable independence of the expert witness, and went even further in terms of endeavouring to procure a reduction in the degree of affiliation between expert witnesses and the parties calling them, as well as in securing greater transparency and accountability for expert opinions. Each of the measures implemented in the Direction has significant potential for reducing inappropriate levels of partisanship on the part of forensic scientists with their principal clients.

However, such solutions only go so far. A feature which the overwhelming majority of the cases referred to in this chapter have in common is that they miscarried at trial. The lawyers with responsibility for making the scientific witnesses accountable for their views and the methodologies that they employed in working from their data to their forensically expressed opinions failed. Partly this is a function of the difficulty of the task which they confronted, and of the limited skills and expertise of their training as legal professionals, but it also reflects the limitations of practitioners functioning within the legal aid system when the defendants are impecunious and the resources are simply not present to engage in time-consuming, costly and frequently unrewarding evaluations of scientific competence, methodologies and rationales for interpretation.


Chapter IV: Quality

Another feature of most of the cases highlighted is that the miscarriages of justice not only took a long while to come to light; they were only exposed on review because of the continuing intervention of a high profile supporter of the wrongly convicted accused, the persistence of a lobby group, or the exposure of inadequacies within the forensic science establishment by a whistle-blower. In other words, the legal system, at trial and at appellate level, did not succeed within the short or medium term in dealing with either poor science or scientific fraud. Acknowledging this and the limitations of most lawyers, and of the funding constraints that affect the trial and appellate process, solutions need to be sought elsewhere.

The Office of the Inspector General in the United States and the Royal Commissions in Australia and England have highlighted the ability of independent scientists to facilitate detection of poor quality and fraudulent workmanship in forensic science. A standing body, such as a National Institute of Forensic Science, whose role it could be to conduct reviews of scientific work in state laboratories without notice, has the potential to monitor scientific deviance and the development of inappropriate cultures within existing state-run laboratories. Being a body principally using the services of highly regarded scientists without a vested interest in the results in any particular case, it would have the potential to provide an objective evaluation not just of the work processes of individual scientists but of cultural issues and management deficiencies within laboratories which might in due course give rise to errors or frauds. Auditing of error can be a potent tool for improvement in scientific practice.

There are no panaceas for error in forensic science. Like error in science generally, it is the product of a complex amalgam of dynamics and agendas. What can be undertaken in face of its disturbing incidence, and its potential to secure the conviction of the innocent, is a sophisticated response by laboratory managers to inappropriate cultures of bias and poor practice. There is a role too for the law, for scientific regulators and monitors of scientific quality to reduce the incidence of scientific deviancy. Environments in which unscientific practice is legitimised need to be marginalised and exposed. Encouragement needs to be given to those concerned enough to air their concerns. Response needs to be independent

62 The Office of Scientific Integrity (OSI) established in 1989 within the United States Department of Human Services (DHH) has not fared so well. The DHH awards more research dollars than any American government agency, and so can be expected to confront more instances of fraudulent and poor quality science than any other United States government department. By 1992 the OSI was absorbed into the Office of Scientific Integrity (ORI) under the Office of the Assistant Secretary for Health but by 1993 controversy enveloped the ORI when it became apparent that scientists appealing to the Department's Research Integrity Adjudication's (RIA) Panel against initial findings of misconduct were consistently proving successful.

63 See e.g. S.C. Gad and S.M. Taulbee, Handbook of Data Recording, Maintenance and Management for the Biomedical Sciences, Boca Raton: CRC Press 1995, p. 5.
and prompt. Punishment within the scientific community needs to be by shaming and exclusion. The risk of being revealed as partisan of prepared to take short-cuts of give misleading reports of tests must become high enough to act as a sufficient disincentive.

References
Hansen, M., Lab Evidence Questioned, American Bar Association Journal, July 1994, 80, p. 16.
Chapter IV: Quality


1 Introduction

Whoever compares the social environment of contemporary man with that of his primeval ancestors, it will not escape his notice that there has been progress, in any case in a material sense. The almost sole concern of primitive man was to make sure that he had sufficient water, food, clothing and shelter at his disposal. Through the ages however, beside these necessary conditions for survival, new needs have arisen such as those that can be seen in the modern western society with its focus on luxury goods and technological innovation.

Without going into whether this is a case of cause or effect, it is perceptible that the organization of society altered itself parallel to this. The first forms of society were characterized by self-provision that is to say one produced in order to provide for one’s own needs. With the development of villages and towns a change came about: craft specialization (trades!), barter and production intended for the ‘market’ made an onset. An historical example of this development is the society of the (late) Middle Ages in Western Europe with a dominant position of the so-called guilds. The increasing distance (in time and location) between producer and consumer led here to the need to make certain demands on the products. The consumer was no longer able to present his demands and desires to the producer; others had to do this. Quality inspections and hallmarks came into use.

With the arrival of the industrial revolution and the possibilities of mass production and the concurrent mass consumption, the role of the guilds with their traditional handwork came to an end. The distance between producer and consumer grew further. Mechanization enabled a spectacular increase of the speed of production. Also a larger variety of products became available. A classic example of this originates from the United States in the twenties where the appearance of cars in various colors on the market was experienced as being revolutionary. The competition increased and the market dynamics became an important mechanism in arriving indirectly at quality demands. Quality controls modeled after statistical techniques were carried out on the end product and often took place literally at the end of the conveyor belt. Initially a certain percentage of waste was acceptable. This evolved into the notion that more attention should be paid to the whole production process and led among other things to the
Chapter IV: Quality

producer's attention being shifted from the product more towards the production process.

A new step in the development of the 'quality thinking' was the insight that not only the production process but also all the supporting processes played a crucial role in the functioning of the business. A last step in this development, for the time being, was the introduction of the so-called total quality management, which features a complete integration of all aspects of a business (for example leadership, establishing a policy, impact on society and people satisfaction).

A final comment concerns the meaning of the concept 'product'. Initially reserved for tangible objects, later on this concept was applied more broadly for example to services (transport, holidays etc.).

2 Central concepts and principles

In the above historical sketch the concept 'quality' is primarily approached from the viewpoint of the consumer of the product. The consumer makes demands either explicitly or implicitly and judges the product on its suitability for its intended purpose. This approach to quality is still in vogue and is easily put into practice. This is an important ascertainment because it underlines the idea that quality is not synonymous with the highest degree of excellence. The highest degree is not always necessary or desired. The wide range (in variety and price) of for example shoes, cars, restaurants etc. proves this clearly. This belies the idea that the level of quality is determined exclusively by the supplier and not in the first place by the customer.

The ISO definition of quality does justice to this conception: the degree to which all the properties of a product, process or service meet the requirements imposed on them as a result of the intended purpose.

In this context, alongside the definition of quality, the definition of a quality management system is relevant: a system of administrative procedures and rules imposed to ensure that a product, process or service meets the requirements laid down.

These concepts formed the foundation for the International Organization for Standardization (ISO) 9000 standards that were first published in 1987. The publication of these standards is to be considered a landmark and signified an important impulse for the quality assurance as an independent discipline. The ISO 9000 standards were initially applied mainly in industry. However, in later years government institutes and other non-profit organizations were also implementing quality management more and more often. For the establishment and maintenance of a quality management system more standards are available. Standards for quality management systems are developed by international organizations such as ISO, CEN (Commune Européenne de Normalisation) and ASTM (American So-
ciety for Testing and Materials). These organizations developed standards for quality management systems in laboratories, mostly independent of one another.

There was a need for special standards for laboratories, because research in a laboratory has many specific aspects that can influence the quality of the end result. Examples of this are measures that need to be taken for the control and handling of chemicals and reagents, the control and use of reference materials and the maintenance and calibration of equipment. These aspects are often missing in the general standards for quality management systems. For this reason laboratory standards have been developed in which demonstrability and technical competence of the laboratory take a central position. Well known standards are: ISO guide 25, DIS 17025, EN 45001 and the standards for Good Laboratory Practice (mainly used in pharmaceutical research).

Regarding the contents of, for instance the standard EN 45001 all aspects of a laboratory's operation are covered (table 1).

<table>
<thead>
<tr>
<th>Table 1 Contents of standard EN 45001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization and management</td>
</tr>
<tr>
<td>Quality management system</td>
</tr>
<tr>
<td>Quality audit and review</td>
</tr>
<tr>
<td>Staff</td>
</tr>
<tr>
<td>Equipment</td>
</tr>
<tr>
<td>Calibration</td>
</tr>
<tr>
<td>Methodology</td>
</tr>
<tr>
<td>Laboratory environment</td>
</tr>
<tr>
<td>Sample handling and identification</td>
</tr>
<tr>
<td>Recording of test data</td>
</tr>
<tr>
<td>Reporting of results</td>
</tr>
<tr>
<td>Complaints and dispute procedures</td>
</tr>
<tr>
<td>Sub-contracting</td>
</tr>
<tr>
<td>Use of outside services</td>
</tr>
</tbody>
</table>

Nowadays, a whole range of standards and related documents is available. An overview of the most important standards for laboratories is to be found in table 2 (See end of chapter due to size of table).

In the last few years an attempt has been made to limit the number of standards by means of harmonization programs. A good example of this is the integration of EN 45001 with ISO-guide 25 resulting in DIS 17025.

The main purpose of a quality management system, based on the above-mentioned standards, is to guarantee as far as possible that the product meets the requirements. It is important to note that a quality management
system is a set of procedures and rules. A good product should not be a 'lucky shot'. In other words: the characteristics of a product must not be a surprise at the end of the production process. A quality management system is a help to control the process; the quality of a product should be 'under control'.

For an organization that has adopted a quality management system standard, there is the possibility – on a voluntary basis – of inspection by an independent body. If the body confirms that all requirements laid down in the standard are met, this is called the certification or accreditation of the quality management system. Because the body is independent, this is known as a 'third party' accreditation. In most countries there are national accreditation bodies under governmental control. For instance: UKAS (United Kingdom), BAM (Germany) and Raad voor de Accreditatie/STERLAB (the Netherlands).

Even if a 'third party' accreditation is not sought after, the adoption of a standard can be an aim in itself. On the grounds of its chosen standard the organization does its best to improve its quality management system, which can have a stimulating influence.

3 Quality and forensic science

The most important goal of the forensic science is uncovering facts, making use of observation and research according to scientific principles. It is therefore doubtful if the predecessors of the forensic science, such as divine judgment and forcing a confession by means of the rack, would have been considered for a quality certificate.

In the second half of the 19th century criminalistics started to develop. In France, Bertillon introduced an anthropometrical method for the identification of people. New possibilities in the field of photography, microscopy and chemistry started to be utilized in scientific investigation into the events leading to offences. At the same time test methods were developed, for example for arsenic and mercury in organs. Individual scientists, who were generally involved in a case on police initiative, primarily carried out research of this kind. Only a few of these experts dedicated themselves completely to forensic science and there was definitely no question of specialized forensic institutes. The quality of the results that the new science produced at that time can be questioned when compared to present-day standards.

Ever since the 1920's forensic research is carried out more and more often at special research institutes. The first of these is the forensic laboratory in Lyon (1920), followed by laboratories in the United States (1923) and England (1934). Directly after the second world war forensic laboratories were established in a number of European countries, for example in the Netherlands, Sweden, Finland, Austria and Germany. The
value of the research carried out in these institutes is still strongly dependent on the professional skill of individual researchers.

The attention paid to quality increased slowly. The debate, at the close of the sixties about how many corresponding characteristic points ('typica') should be found in order to be able to ascertain that two finger-prints originated from the same person, is essentially a debate about quality.

Externally also, pressure is being exerted to guarantee the quality of forensic research as much as possible. The detailed regulations that have been laid down in the Netherlands in the seventies for the carrying out of the blood test in the case of suspicion of driving under influence are an example of this.

In the eighties, the forensic laboratories also could not escape the ever-increasing interest in quality assurance in the 'outside world'. The idea came about that also in the forensic world a systematic approach to quality is a good idea and that there were no reasons why the forensic laboratories should stand aside from developments that were taking place everywhere. In addition to this, the expert's findings were considered more and more critically. These were no longer unconditionally accepted as being correct. Critical questions about the whys and wherefores were on the increase, also in the courtroom. This led to the need for a better foundation of conclusions and more extensive documenting of methods used, observations and (in between) research results. An important principle of quality, that of the demonstrability, fitted in excellently with this need. It is then no surprise that a number of forensic institutes (UK, Finland, Netherlands) took the first steps on the way to a (laboratory) accreditation.

The application of the standards and criteria drawn up for 'ordinary' laboratories, often strongly aimed at the carrying out of routine analyses, is in forensic laboratories not without complications. There are various reasons for this:

- Although there are areas that do involve routine analysis (narcotics, blood alcohol), in most cases creativity and experimenting are necessary in forensic work in order to be able to answer specific research questions.
- As a rule, research is carried out on far from ideal and extremely variable research material. This makes special demands on for example the robustness of the methods employed and on acceptance procedures.
- The interpretation of test results, paying attention to their mutual coherence, the context of the offence and relevant legislation, requires much knowledge and experience. Such interpretations are potentially

1 Robustness is a measure for the insensitivity of the result of a research method to deviations in execution conditions and properties of materials. In the case of a robust method, these deviations have little influence on reliability and accuracy of the end result.
influenced by personal opinions; the boundaries between objective and subjective research are not always clear-cut.

- The consequences of incorrect conclusions and other mistakes can be very serious. This applies primarily to suspects in the event of ‘false positive’ (unjustly incriminating) conclusions. This is often seen as a reason to, unlike in ordinary laboratories, give more attention to the avoidance of false positive results than of false negative. (On the other hand, too large a number of false negative conclusions is considered by society and certainly by victims as unjust; it frustrates the judicial process).

- In many forensic research fields the usual quality assurance techniques are difficult to apply.

Of these complications the first (routine versus creativity) turned out to be the most tenacious. Up to this day one sometimes hears that quality management is not applicable in the forensic world, the ‘creativity is killed’ because of the existence of standard procedures. This line of thought assumes erroneously that forensic researchers working within the framework of a quality system begin an investigation like robots. Often however, the first step of an investigation will be to formulate a hypothesis on the basis of the questions asked and the context of the offence and from this starting point to subsequently prepare a number of experiments and make a plan of investigation. This is often a very creative process and there is no question of there being a readily available standard procedure for this. Neither should one strive to achieve this. At the most, information on comparable cases from the past can be available or a checklist with points of special interest for a particular type of offence can support and structure the creative process. Moreover, the availability of well accessible documentation of this nature can be an important item within a quality system.

Clearly written standard procedures become useful as soon as the plan of investigation results in a number of laboratory analyses actually being executed. Examples of this are the extraction of morphine from blood, measuring the gauge of paper or the making of a DNA profile. These are activities that require a reliable execution with a correct result rather than creativity. An added advantage is then not having to search for the optimal method for each new test and that no time is wasted unnecessarily on this. Furthermore, it is important to continually substantiate, optimize and improve the standard procedures. For this, much creativity and inventiveness are also necessary. Also, because of in-between results and other new information becoming available, the re-adjustment of a plan of investigation requires continual alertness. All in all this makes sufficiently clear that the argument of ‘killed creativity’ is unsupported.

It appears however that these summed up complications are not insurmountable: in the nineties a number of forensic laboratories in Europe has
actually been accredited, partly on the basis of special supplementary criteria for forensic work. It is expected is that the remaining laboratories, with assistance of the experience of these pioneers, will also acquire their accreditation certificate in the future. These developments are brought about by the mutual contacts that forensic laboratories maintain, in which a reciprocal stimulation is provided to follow the path of quality. However, it remains a fact that accreditation cannot cover all aspects of forensic work and that in the future also there will still be many possibilities for quality improvement.

4 Use of standards in forensic laboratories

4.1 Selection of a standard

Forensic laboratories occupy a special position among laboratories because of the aspects mentioned in the previous paragraph. Also in some cases an international exchange of research results is desirable. This demands that the research and the results are comparable as much as possible. All in all reason enough for careful selection of a standard for the implementation of a quality management system in a forensic laboratory.

With a view to the international co-operation, a general and internationally recognized standard such as DIS 17025 would be the most appropriate. Specific forensic aspects however, do not appear in DIS 17025. For these reasons in the UK, USA and Australia (supplementary) standards have been developed for a quality management system in forensic laboratories. These standards and documents are also included in table 2. The International Laboratory Accreditation Conference (ILAC), the global co-operative alliance, is working on an international document that includes the requirements for forensic laboratories (state of affairs 1999). This document will be a supplement to DIS 17025. For most forensic laboratories this document, in combination with DIS 17025, will eventually form the most suitable basis for establishing a quality management system, certainly if it is desirable that the quality system is tested and accredited by an official accreditation organization.

At this moment however, the majority of forensic laboratories still bases its quality system on the (general) laboratory standard EN 45001 supplemented with the specific forensic standard NIS 46. A quality management system based on EN 45001 has two aspects: a more general one and one concerning specific expertise. Both types of aspects are found in this standard.

The EN 45001 standard was originally meant for so-called testing laboratories. Strictly speaking, testing laboratories are those that perform repetitive tests (for instance, drinking water laboratories or clinical laboratories in a hospital) and the results of these tests are data with a well-defined precision (for instance a particular concentration of sodium in water). This
type of testing is called objective testing. According to this definition a forensic laboratory is only a testing laboratory for part of its activities, because forensic reports usually not only contain data from laboratory analyses, but most of them also include a statement or conclusion. In this, a forensic laboratory differs from testing laboratories that present clearly defined results without any interpretation or conclusion. It is not correct to suppose that a forensic laboratory cannot be accredited because it does not comply with the definition of a testing laboratory. There are two reasons for this. Firstly, in practice, the definition of a testing laboratory is interpreted more broadly. Secondly, a special standard for forensic laboratories, the NIS 46 was issued by UKAS, in addition to EN 45001.

The combination of these two standards can be the basis for the accredited quality management system of a forensic laboratory. Based on the experiences of some years now, it can be said that these seem to be, reasonably satisfactory in practice. However it should be realized that not all activities of a forensic laboratory are covered by these standards. There is an important and strict limitation: only objective methods can be accredited. The definition of an objective test will later be discussed in more detail.

4.2 Assurance possibilities

In a forensic laboratory most of the time is spent on carrying out tests on so-called exhibits (research material that is submitted in connection with the investigation or furnishing of proof) and the making of an expert's report on the results of these tests. In this framework forensic work consists of carrying out research, producing test results and the interpretation of these. Within quality management it is understood that only objective tests can be accommodated in an accredited quality system: an objective test is one which, having been documented and validated, is under control so that it can be demonstrated that all appropriately trained staff will obtain the same results within defined limits. Objective tests will be controlled by a) documentation of the test, b) validation of the test, c) training and authorization of staff, d) maintenance of equipment and where appropriate by: e) calibration of equipment, f) use of appropriate reference materials, g) provision of guidance for interpretation, h) checking of results, i) testing of staff proficiency and j) recording of equipment/test performance.

Factors linked to individuals such as perceptive ability and the experience of the researcher play a large part in many typically forensic tests such as the comparison of handwriting, the reconstruction of a fire in a home or the comparison of bullets. Because of this, one can sometimes be under the impression that such forensic tests are subjective and do not fit into a quality system. In a large number of cases however, it is possible to apply measures of quality assurance to these tests too. For example the validation of these tests, the repetition of the test by an additional independent re-
searcher (within the institute or even by a countercheck carried out in a separate institute) and participation in collaborative tests. However, it is important that the results of these tests are standardized. As already mentioned in the definition of an objective test it must be possible to demonstrate that the results (of the additional researcher for example) are within previously defined limits.

Therefore it is important to pay continual attention to the search for suitable control points in order to ensure the objectivity of the various forensic tests. In doing so the emphasis will, in the first instance, be placed on the best possible assurance of the first phase: the procurement of objective test results. In a later phase it is also important to describe the steps of interpretation and where possible to apply measures of assurance to these.

The following assurance possibilities exist for the carrying out of (objective) forensic research:

- Documentation of the test
- Validation of the test
- Training and authorization of staff
- Maintenance of equipment
- Calibration of equipment
- Use of appropriate reference materials
- Provision of guidance for interpretation
- Checking of results
- Proficiency testing
- Recording of the above-mentioned equipment/test performances

The number of assurance possibilities seems to be extensive. In practice however, the applicability of a number of these assurance possibilities appears to be significantly less simple. To still find solutions for this is an important challenge for forensic scientists in the coming years.

For example the number of collaborative tests for typical forensic work like comparison of tool marks, handwriting tests, comparison of documents or explosives is very limited. At this moment only one official organization, the Collaborative Testing Service (in the USA), offers these collaborative tests, most of them with a frequency of only once a year.

---

2 A collaborative test is an assurance method originating from the analytical chemistry. This method consists roughly of the following, that the organizing laboratory presents an identical sample to all the participating laboratories. The participating laboratories report the analysis results within an agreed time to the organizing laboratory. After which the correct analysis results are made known to the participants. In this way an insight into the reliability of the analysis method is gained and the participating laboratories can test the precision of their own method. Collaborative tests can be carried out in various ways and can, in some laboratory branches, have a compulsory character with sanctions if particular accuracy requirements are not met.
The same applies to the availability of (certified) reference materials. For many typically forensic tests these are not available. There is no standard fingerprint for sale or a standard screwdriver mark in a doorpost. Furthermore, the carrying out of a test in duplicate or the repeating of a test is not always possible. The amount of sample material handed in is often too small for this (a small splinter of glass) or the test is destructive which means that repetition is impossible.

For several other tests like toxicological tests or environmental tests the number of assurance possibilities is far more extensive because in these cases the co-operation with other lines of business such as hospitals or commercial environmental laboratories is well conceivable.

4.3 Remaining aspects

When establishing a quality system, attention should be paid not only to the application of assurance possibilities but also to other measures. For a forensic laboratory this could specifically be the organizing of an 'unbroken chain of custody' for the exhibits. This means that for each exhibit at any given moment it is possible to demonstrate who is (has been) responsible for the supervision of the exhibit.

It is also important to pay attention to the prevention of contamination. Contamination can occur, on the one hand by transfer of trace material from high level exhibits to exhibits with low levels and on the other hand by transfer from the suspect's exhibits to those of the victim. This makes demands on the packaging material used for the collection, transport and storage of exhibits.

In addition to the above-mentioned examples of typically forensic aspects that play a part in the implementation of a quality management system in a forensic laboratory, one should of course also observe the general measures that apply to a quality system in a laboratory (for instance calibration of equipment, handling of chemicals).

A very important aspect within the quality management of a forensic laboratory is the knowledge and ability of the researchers. Attention will be paid to this separately, in a later paragraph.

4.4 Customers

In a quality system the role of the customer is crucial. After all, customer needs and wishes must be satisfied. However, the question 'who is the customer?' is for a forensic laboratory not an easy one to answer. In the broadest sense of the word the following categories of customers can be distinguished:

- Police and other investigative bodies
- Public prosecutor
- Judiciary
- Minister of Justice
- The Bar
• Experts acting for the opposing party
• Suspects
• Society

In order to make the concept 'customer' practicable it is understood as a rule that the customers are the direct users of the products; mainly the police or a criminal investigator, the Public Prosecutor or the judge. With this limited definition of the concept customer however, one has to bear in mind the possibly opposing interests, demands and wishes of the other customers.

A characteristic example of this concerns the demands made on the contents of an expert's report. It is conceivable that during the investigation there is a confident belief that the suspect is guilty, while this is not or only weakly supported in the expert's report. In this case it is not acceptable that the wishes of the criminal investigator are complied with in order to support the accusation more strongly. The fact is both the judge and the suspect must be able to depend unconditionally on the impartiality and independence of the forensic report.

Another example in this context is the giving of a full account of the research method in an expert's report. In the case of a new and research-intensive forensic test, the suspect or the lawyer will want the principle of the research method to be made known. This is relevant in relation to research carried out for the tracing of a computer password. As soon as the research method is known however, criminality can adapt to this quickly, which can hinder future research. In short, another case of opposite interests and wishes of 'customer' groups with regard to a forensic product.

5 Effects in the chain

A forensic test within a forensic laboratory is nearly always part of a longer process. The police generally deliver the testing material and after the laboratory test is completed a report is made, usually – depending on the law system – to the police or Public Prosecutor. The process, when viewed as a whole can be seen as a chain of partial processes. Typical landmarks in this chain are: investigation at scene of the crime – tactical and technical (preliminary) investigation – laboratory tests – making of laboratory reports – decision on prosecution of suspect – court session – sentence. What is special about this series of stages in the process is that various actors successively play a leading part: police officers, scene of crime officers, forensic scientists, prosecutors and judges. The successive actors continually have to deal with (and are therefore largely dependent on) the products supplied by the previous actors. It is then obvious that there should be harmonization within the chain. This of course not only concerns the forensic chain described here in broad outline, but also is a rather general problem. It can be seen as being related to the modern way of thinking on
Chapter IV: Quality

quality and in particular to the ISO-definition, in which is stated that the customer expresses a number of demands or wishes which form the basis for negotiations with the supplier. Bearing this in mind, the classical supplier-customer relationship is also evident in the forensic chain and the issue can be approached from this point of view. The quality of the whole chain can be improved in this way. In practice (and this is also the case for the forensic chain) problems often arise with this because of the lack of possibilities to enforce the meeting of the demands made on the product. In a supplier-customer relationship where no payment takes place, a mechanism for this is mostly absent. For the forensic chain it would be a good thing if all the actors were aware of the fact that they are part of a chain and that a chain is only as strong as the weakest link. A good example of 'chain thinking' is to be found in the drunk driving legislations in various European countries. Here the procedures (including the analysis protocol) are mostly standardized to a great extent and prescribed materials are used. A so-called blood alcohol block contains one or two sample tubes in which a preservative and an anti-coagulant, a set of unique identification seals and a syringe for taking blood are already present. In this way it is guaranteed that a blood sample is collected in the correct manner, that the alcohol level stays stable and that the sample is traceable to the right suspect. Often provisions are made to enable the possibility of a counter check at a later date. Because of these strict regulations there will be little or no reason for the suspect, the public prosecutor or the judge to doubt the accuracy of the alcohol level found. Also for other types of laboratory tests, in imitation of the blood alcohol block similar sampling sets were developed, for example for the collection of biological material for DNA tests and gun shot or fire residues. The sets always contain written instructions that give a further explanation on how it should be used.

In recent years within the quality management the interest in mutual dependence and other chain related issues is clearly on the increase. Within the framework of total quality management, models have been developed in which orientation on the chain has been given an important position. A relevant example of this is the EFQM model; an acronym for European Foundation for Quality Management.

In this connection the possibility of carrying out an audit along the whole chain could be mentioned. In the case of a horizontal audit like this, it will become clear to what degree optimization along the whole chain takes place or whether the various actors have been working more towards a sub-optimization within their own link. At this moment there are hardly any or no examples known of audits that extend over the whole forensic chain. An important part of this can be explained by the fact that the actors belong to different institutes and that the chain as a whole is not clearly directed. A classic means for laboratories to check whether the receiver of reports values the product and considers this to be usable is by
carrying out a customer satisfaction survey. Forensic laboratories will also be utilizing this instrument more and more often.

6 Personnel

The quality of the products and services of forensic laboratories (reports, conclusions, interpretations) has always strongly depended on the professional skills of the individual forensic researchers. In spite of all the developments in the field of quality assurance relating to real laboratory activities, this has not altered much yet. In order to be able to guarantee a minimum quality, the professional skills of the researchers have to meet certain demands. These demands are partly related to having knowledge and skills (and the correct application of these), but in addition to this the attitude of the forensic expert is also of importance. For example one could think of such qualities as conscientiousness, creativity and awareness of all aspects of a case. For that reason, although prospective forensic experts are almost always required to receive intensive internal training, a careful recruitment and selection of new employees is of overriding importance. A clear description of the desired knowledge and experience, but also — and above all — of the desired personal qualities can provide a good basis.

6.1 Fields of expertise

Given the present range and state of forensic science, it is actually no longer possible to keep up with all developments and to achieve sufficient depth without dividing the forensic work up into fields of expertise. Such a division has been made by many of the European forensic institutes. Although there are differences between countries, there are chiefly resemblances. Below, as an example of such a division, are the categories as employed by the International Forensic Science Symposia that is periodically organized under the auspices of Interpol;

- Toxicology
- Biological evidence
- Fibres
- Firearms
- Explosives
- Tool marks and impressions (including fingerprints, shoeprints and tire impressions)
- Forensic linguistics and acoustics
- Fire cause and fire debris analysis
- Drugs
- Paint and glass
- Questioned documents (including handwriting)
- Digital evidence
Chapter IV: Quality

- Image analysis
- Soil
- Environmental crime

The largest differences between the forensic laboratories occur in the following fields of expertise. Traffic Accidents & Vehicle Identification, Environmental Crime and Digital Evidence & Image Analysis. It depends on the legislation and views of the various countries whether or not the forensic laboratories carry out these tests.

This does not alter the fact that alongside the specialist knowledge a broader overall picture is also necessary. In accordance with this, an expert in the field of handwriting comparison should certainly be well acquainted with methods used in making latent writing visible again. He should also be capable of noticing small blood spots on a document and be familiar with the fact that human blood is demonstrable with a biochemical test.

Tests must subsequently take place in the right order, partial conclusions for a particular field can guide future testing in other fields and sometimes an overall conclusion, based on the results of the testing in various sub-fields, must be drawn.

These remarks lead to the conclusion that an extensive splitting up into too many fields of expertise is undesirable. There is then an actual danger that in the long run there will only be super specialists in a very narrow field of expertise. Forensic researchers are expected to be, alongside their own specialism, well informed of the possibilities and developments in other fields of expertise and have a certain general knowledge of what the possibilities are in forensic science.

On the grounds of the above-mentioned, the necessary knowledge and skills of the forensic expert can be divided into four fields:

- General personal skills like communicative skills. For instance writing skill, necessary for the drafting of clear reports which are also comprehensible for the layman and presentation skills, particularly in connection with appearing in a court session. (The latter will however, be far more important in some countries than in others, depending on the legal system.)
- Knowledge and skills that are typical for the science in which the expert has received his higher (university) education (e.g. physics, chemistry, biology).
- General forensic knowledge. This concerns knowledge of criminal law (types of offences), criminals’ methods (modus operandi), the methods of police and judiciary, insight into the course of events in criminal proceedings and such like. And of course subjects like criminalistics, statistics, quality assurance principles and safety. It is true that some sub-
jects are familiar from one's scientific education, but in the forensic context new, usually specific accents must be placed.

- Special forensic knowledge (in one's own field of expertise). This is acquired chiefly by the actual carrying out, under supervision, of case work (on the job training) but also for example by studying specific specialist literature, visiting congresses, examples of former cases, jurisprudence etc.

6.2 Internal training

A large part of the required knowledge for the forensic expert is so specific, that it cannot be expected that new employees will already have acquired this outside a forensic institute. For a forensic institute the internal training of employees is therefore particularly important.

In its simplest form this mostly consists of copying the art of experienced experts. Within a serious quality system the training of experts should however take place in a structural manner. Essential elements are then a training scheme based on clearly defined educational objectives and an independent examination of the results achieved based on criteria determined beforehand. Such an examination is preferably not only related to the knowledge acquired during the training, but also to the proficiency of putting this into practice.

The granting of authorizations, for example to sign reports or to appear in court, can be based on such an examination. In order to make sure that the professional skills of the forensic expert also stay up to date over a longer period of time, the duration of such authorizations can be limited, for example for four years. After the expiry of the authorization it should then be tested whether the professional skills are still up to date. Within such a system this is called certification of personnel.

7 International aspects

7.1 Present state of quality assurance in European forensic laboratories

A survey (1998), which was circulated among a large group of forensic institutes in Europe, shows that the interest in as well as the implementation of quality management is growing. In this survey data from 31 institutes and from 22 different countries was collected.

A few details from this survey:

- All respondents except one took part in collaborative exercises mainly organized by the CTS (Collaborative Testing Service, USA) or ENSFI-working groups.
- All respondents were working on a quality management system (in the planning stage, the organization stage or the further development of an (already accredited) system, two thirds of these had already appointed a quality manager.
Chapter IV: Quality

- Among the respondents the following standards were employed for establishing a quality management system:
  - ISO 9000 series 11
  - EN 45001 or ISO guide 25 25
  - ASCLD/LAB 0
  - National standards like NIS 46, M10 etc. 5
- Seven respondents were accredited at that time for various fields of expertise on the basis of EN 45001 and or ISO guide 25.
- The main problems mentioned by the respondents in establishing an accredited quality system were: lack of means (time or money) or not having the required information at one's disposal.

Ultimately, European co-operation was considered by all respondents to be very important.

7.2 European co-operation
In the autumn of 1997 a European Quality Assurance Working Group was established under the umbrella of ENFSI. Now, in 1999 the working group has 33 members in 21 different countries. The objective of the working group is (in brief): to provide a framework for the ENFSI member laboratories and other working groups within ENFSI to help them adopt QA principles and comply with international standards.

The working group has a role in:
- The drafting of guidance documents and policy documents on subjects relating to quality management (such as best practice manuals, proficiency testing, competence standards and management of reference materials and databases).
- The identification of suitable standards for the establishment of a quality management system.
- The promotion of quality management and the accompanying standards.
- The co-ordination of the setting up of proficiency tests.

7.3 Policy and guidance documents
Policy documents are as a rule meant for the ENFSI Board. The ENFSI Board presents these documents to the ENFSI members (the directors of the forensic institutes) and after approval and acceptance these statements should be implemented in the forensic institutes.

Guidance documents are intended for the members of the Quality Assurance Working Group and the other working groups. They can be used in the establishment and maintenance of (parts of) the quality management system.
As written earlier there are various standards and related documents available for the establishment of a quality management system. The ISO guide 25 or an equivalent standard such as EN 45001 or the new standard DIS 17025 are recommended by the Quality Assurance Working Group as the most suitable norm or standard.

7.4 Encouraging quality management

In order to help forensic institutes with the establishment and maintenance of a quality management system, various activities are carried out by the Quality Assurance Working Group such as:

- The setting up of international workshops on the establishment of a quality management system, the use of the relevant standards and accreditation of the system.
- The issuing of a list of all European accredited institutes.
- The acting as an intermediary between accredited establishments and forensic institutes, where desired.
- The provision of assessors for the purpose of accreditation.
- The encouragement of adoption of or co-operation with a forensic institute in order to exchange information, visit one another's institutes and in this way to help with the establishment of a quality management system.

7.5 Co-ordination of proficiency tests

The Quality Assurance Working Group co-ordinates the setting up of proficiency tests. This means the encouragement of various working groups to set up proficiency tests, particularly in fields of expertise in which as yet little or no proficiency tests are available. In addition to this the working group issues guidelines for the implementation and the checking of proficiency tests.

8 The future

The quality virus has reached the forensic world and after a somewhat hesitant start we see that many laboratories are seriously engaged in the question of how quality principles can be applied. How can we upgrade the quality of our work, how can we make the quality visible and demonstrable, is the quality high enough, are there suitable standards available for the forensic world, is it still practicable or are we getting bogged down in a bureaucratic system, etc. are the questions that then arise. Without a doubt the forensic community will find the answer to these questions. To achieve this, many discussions are necessary with all those involved. A discussion (in itself extremely valuable), which leads to (self) reflection hopefully resulting in inspiration to start the coming years well considered and energetically with regard to quality questions.
Chapter IV: Quality

In addition, it is to be expected that the interchangeability of laboratory results will become more important on a European level. Being able to have (international) trust in one another's work will surely be strongly promoted if the research takes place under the regime of a recognized quality system. The forerunners—who for the time being are to be found in West and North Europe will be able to give advice to the laboratories that have not yet reached this stage and also give support. In other ways it is conceivable that by giving European grants a specific impulse can be given to these developments.

Finally, it is worth mentioning the fast development of total quality management (TQM) on the basis of the European Foundation for Quality Management model, in which the 'chain' is emphasized. This could lead to the forensic laboratories instigating a discussion in which the police and the magistrature are also involved.
### Table 2  Overview of standards for a quality management system

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>International</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 8402</td>
<td>Quality vocabulary – international</td>
<td>For quality management and quality assurance systems related to the production process.</td>
</tr>
<tr>
<td>ISO 9001-series</td>
<td>Quality systems</td>
<td>Simultaneously fulfils the requirement of the ISO 9000 series of standards, since the laboratories operate as producers of calibration and test results. (is under revision)</td>
</tr>
<tr>
<td>ISO/IEC Guide 25</td>
<td>General requirements for the competence of calibration and testing laboratories</td>
<td></td>
</tr>
<tr>
<td>ISO/IEC Guide 49</td>
<td>Guidelines for the development of a quality manual for a testing laboratory</td>
<td></td>
</tr>
<tr>
<td>ISO/IUPAC/AOAC-protocol</td>
<td>Harmonized protocol for internal quality control in analytical laboratories</td>
<td></td>
</tr>
<tr>
<td>CITAC-guide</td>
<td>International guide to quality in analytical chemistry. An aid to accreditation</td>
<td>Based on WELAC/EURACHEM guidelines and incorporating GLP views from outside Europe.</td>
</tr>
<tr>
<td><strong>European</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN 29000 series</td>
<td>General criteria for the operation of testing laboratories</td>
<td>European adoption of ISO 9000-series</td>
</tr>
<tr>
<td>EN 45001</td>
<td>General criteria for the assessment of testing laboratories</td>
<td>Compliant or equivalent with ISO/IEC guide 25</td>
</tr>
<tr>
<td>EN 45002</td>
<td>General criteria for laboratory accreditation bodies</td>
<td>European adoption of ISO/IEC Guide 58</td>
</tr>
<tr>
<td>EN 45003</td>
<td>General criteria for the operation of various types of bodies performing inspection</td>
<td></td>
</tr>
<tr>
<td>EN 45004</td>
<td>General criteria for certification bodies operating product certification</td>
<td></td>
</tr>
<tr>
<td>EN 45011</td>
<td>General criteria for certification bodies operating quality system certification</td>
<td></td>
</tr>
<tr>
<td>EN 45012</td>
<td>General criteria for certification bodies operating certification of personnel</td>
<td></td>
</tr>
<tr>
<td>EN 45013</td>
<td>General criteria for supplier’s declaration of conformity</td>
<td></td>
</tr>
<tr>
<td>Good Laboratory Practice (GLP)</td>
<td>Recommendations for setting up and maintenance of a laboratory quality assurance system</td>
<td>Produced by the OECD, is compliant with ISO/IEC guide 25 and complementary to EN 45001 In a lot of European countries monitored by the department of Health for laboratories working in toxicology and other disciplines related to medicine.</td>
</tr>
</tbody>
</table>

359
### Chapter IV: Quality

<table>
<thead>
<tr>
<th>Standard</th>
<th>Title</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draft ILAC document</td>
<td>ILAC guidelines for Forensic Laboratories</td>
<td>About accreditation for Forensic laboratories.</td>
</tr>
<tr>
<td>USA</td>
<td>Standard Guide for Accountability and quality control in the Chemical analysis laboratory</td>
<td></td>
</tr>
<tr>
<td>ASTM E 882-87</td>
<td>Standard Guide for Accountability and quality control in the Chemical analysis laboratory</td>
<td></td>
</tr>
<tr>
<td>ASCLD.LAB</td>
<td>Accreditation scheme for forensic science laboratories</td>
<td>ASCLD.LAB (American Society of Crime Laboratory Directors Laboratory Accreditation Board) is not ISO guide 25 compliant.</td>
</tr>
</tbody>
</table>

#### Australia

<table>
<thead>
<tr>
<th>NATA</th>
<th>Chemical testing — Requirement for registration.</th>
<th>ISO guide 25 compliant</th>
</tr>
</thead>
<tbody>
<tr>
<td>NATA-ASCLD.LAB National</td>
<td>NATA-ASCLD.LAB Accreditation scheme</td>
<td>Consistent with ISO/IEC guide 25 and/or EN 45001</td>
</tr>
<tr>
<td>Divers accreditation standards of the national accreditation bodies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAMAS NIS 46</td>
<td>Accreditation for Forensic Analysis and Examination</td>
<td>Produced by UKAS (United Kingdom Accreditation Service).</td>
</tr>
</tbody>
</table>

#### Standards and other documents related to Quality Assurance

<table>
<thead>
<tr>
<th>ISO/IEC Guide 43</th>
<th>Proficiency testing by interlaboratory comparison — development and operation of laboratory proficiency testing schemes</th>
<th>A republication of the report International harmonized protocol for the proficiency testing of (chemical) analytical laboratories.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO/IEC Guide 45</td>
<td>Guidelines for the presentation of test results</td>
<td></td>
</tr>
<tr>
<td>ISO/REMCO N280</td>
<td>Proficiency testing of chemical analytical laboratories</td>
<td></td>
</tr>
<tr>
<td>ASTM E 36</td>
<td>Standard Guide for the development and operation of laboratory proficiency testing programs</td>
<td></td>
</tr>
<tr>
<td>ASTM E 1459</td>
<td>Standard Guide for physical evidence labeling and related documentation</td>
<td></td>
</tr>
<tr>
<td>ASTM E 1492</td>
<td>Standard practise for receiving, documentation, storing and retrieving evidence in a forensic laboratory.</td>
<td></td>
</tr>
<tr>
<td>Technical working groups — standards</td>
<td></td>
<td>Standards of (ENFSI) technical working groups within their discipline.</td>
</tr>
</tbody>
</table>
References

ISO 5725-1:1994, Accuracy (trueness and precision) of measurement methods and results – Part 1: General principles and definitions.

EN 45001, General criteria for the operation of testing laboratories.


ILAC, guidelines for Forensic Science Laboratories.


5 Can International Standard Setting Contribute to the Cohesion of the Technological Society?

Nick Huls

1 Introduction

To what does society turn to find a sense of direction if all the traditional reference points break down? Social cohesion is the political slogan the Dutch Government uses to stress the importance of girders in a fragmented society.

The discourse about the best way to organize society is complicated because we live in postmodern conditions. The Great Story of the Enlightenment has lost much of its meaning. The philosophical view that there is no Archimedean point to give us certainty has severely shaken the optimistic belief that society can be strongly influenced and changed as desired.

As the century draws to a close, we are living in a period characterized by postmodern confusion and cultural relativism. Frissen1 applauds the breakdown of the existing categories and urges us to let go of old norms and values and hasten to find a pleasant spot in the Virtual State.

The postmodern liberties and hedonistic morality of the affluent consumer society exercise a tremendous attraction throughout the world. In contemporary society outdated traditions, norms and institutions of all kinds are being discarded. The upside of this development is creative destruction, emancipation and pluriformity of values.

It is not at all clear, however, what will take their place or be left in the wake of extensive individualization and flexibilization. Many wonder what sources of moral cohesion there are in a society in a constant state of flux. How much plurality and change can a society take?

The call for social cohesion seems to be a call in particular for the preservation of soft values such as solidarity with the weaker groups in society and citizen participation that are in danger of disappearing in a society where thinking in terms of economic performance and cool rational scientific discourse prevail. The Netherlands Department of Justice has trans-

Chapter IV: Quality

lated social cohesion, among other things, into Neighborhood Justice pro-
jects designed to bring justice closer to the people. Cohesion of this brand
has a nostalgic ring to it in my ears for what is a neighborhood when we
are living in a time of increasing mobility and fleeting contacts?

David Harvey sees this emphasis on proximity as a possible reaction to
the postmodern condition: 'Its an attempt to carve out at least one know-
able world from the infinity of all possible worlds which are daily shown to
us on the television screen. At its best it produces trenchant images of pos-
sible other worlds, and even begins to shape the actual world. But it is
hard to stop the slide into parochialism, myopia, and self-referentiality in
the face of the universalizing force of capital circulation'.

However, it is global, not local, cohesion that I wish to examine here.
To me, the socialization or communalization of the market and scientific
research, the driving forces in the move toward more uniformity in con-
temporary society, is the challenge presented by our topic. In the following
pages, I will investigate the possible contribution of standardization and
other forms of regulation recently 'discovered' by lawyers to the social co-
hesion debate. Despite all the postmodern confusion, there are two ho-
menizing forces: free circulation of capital and unrestricted technologi-
development. According to Harvey, the combination of these two
trends leads to 'time space compression', i.e. the world continues to shrink
at an accelerating rate.

The belief that society can be strongly influenced and changed as desired
has shifted from the public to the private sector. The rise of standardiza-
tion reflects this development. While the notion that government can steer
or shape society is clearly waning in public discourse, the private sector is
investing considerable amounts to gain control over its markets and do-

mains.

For example, interpersonal solidarity once so characteristic of the pub-
lic sphere is being transferred to the private insurance sector where it is
replaced by actuarial solidarity in the form of risk classifications and pre-
mium differentiation based on scientific research.

Standardization also fits in with the notion of nonstate control. The
interface between commercial and technological development is an out-
standing place for standards and technological norms. They offer a tempo-
rary point of reference in the chaotic and unpredictable dynamics of the
market and scientific research. In this way standardization contributes to
the cohesion of postmodern society.

Standardization processes establish agreements at the national, Euro-
pean and world level for the design and production of products and for

2 Harvey, D., The Condition of Postmodernity. An Enquiry into the Origins of Cultural Change,
3 Huls, N., 'Critical Insurance Law', in Th. Wilhelmsson (ed), Perspectives of Critical Con-
tact Law, Dartmouth: 1993, pp. 149–168.
methods of measurement. Trade and industry have considerable influence on standardization and accreditation. In sectors where science and technology are key factors, trade and industry specify through a process of self-regulation the standards to be met by products, processes and services. While companies become increasingly averse to direct intervention by the government, we observe a wave of self-regulation, of ISO norms and standardization in recent decades. The Ministries of Justice and Economic Affairs support this trend which accords with the policy of deregulation.

In addition, standardization promotes compatibility of production with consumption. 'Compatibilization' is a notion that finds its origin in technology and standardization is expressed in the language of engineers who define as clearly and unambiguously as possible the standards required of products and processes. Standardization reflects the need for coordinated production, interchangeability of parts and compatibility of products.

In Ewald's view, standardization develops along economic as well as sociological lines. It develops outside the state traditionally. The standards bear upon a purely technological, actual state of affairs; they refer solely to technology and are not aimed at an intrinsic normative organization. Standardization is of course not an activity free from value judgments since considerable financial interests are at stake.

't Hart and Foqué also attribute a 'compatibilizing' function to law, but they have in mind something very different from the engineers who standardize. In their view, law is a mediating variable which absorbs or takes into consideration all sorts of conflicting interests, values and ideologies within the framework of the democratic legal order. The counterfactual quality of the law is the focal point of this legal theory. Law may never coincide with actual relations, room must always be left for the 'other side of the story.' Law is no reflection of the real world. The relational legal doctrine developed by 't Hart and Foqué demands attention and respect for the repressed truth embodied in every expression of power. In criminal

---

Chapter IV: Quality

law this approach is inspired by the underdog position of the suspect in relation to the prosecuting state.

This tension is splendidly expressed in two notes by A.C. ’t Hart concerning the measurement of speed in road traffic with hi-tech computer equipment. Because this equipment frequently applies an average standard deviation and criminal law is based on individual requisite guilt, lawyers and measurement experts wrestle with the question of how much importance judges can and should be allowed to attach to the insights of disciplines that work with averages and statistical categories. The law has its own method of fact-finding and representatives of other branches of science should not apply their criteria to the field of law.

After a few remarks (part 2) concerning the position of scientific expertise in the legal system, I will briefly review the legal debate in the Netherlands about standardization (part 3). In part 4 I will address the new European approach to standardization. In part 5, I will make some recommendations for the normative regulation of standardization.

2 The constitutional position of scientific expertise

Through the ages scientific experts have played an important role in the quest for certainty. If in the past no risky venture was undertaken before seeking the advice of seers, diviners or oracles, nowadays specialists schooled in various sciences play a major part.

Scientific expertise enjoys relatively high prestige in modern society and it is therefore not surprising that experts play an increasingly greater role in policy development. As early as the sixties, Galbraith" spoke about a technocratic characteristic of the manner in which the decision process is organized in our society. The growing importance of technicians and other specialists in the legal system is very noticeable as well."

Numerous laws are directly related to technology. From way back, factories and machines have been important objects of safety regulations, but the agricultural and public utilities also have a rich tradition of technological standardization, as do health care and drugs. This type of regulation is impossible without involving experts.

For example, we have seen the development of a large number of rules known collectively as quality control legislation, which concerns foodstuffs, the environment and safety regulations. Substances hazardous for human beings and the environment, additives and pesticides have all been regulated in great detail.

In many areas of law there are technological standards that are regularly adjusted to the state of the art in science and technology. The aura of objectivity makes it attractive for administrators and judges in criminal law and other areas of law to call in experts.

An inevitable side-effect has been the politicization of scientific knowledge. As soon as scholars leave the world of the laboratories, scientific conferences and peer review, and enter the courtroom or the regulation arena, other standards of responsibility apply. Proponents and opponents of legislative measures refer to scholarship to support or defeat a legislative proposal. Science is indispensable to modern society, but standards need to be set to regulate the power of science and a system of public checks and balances must be established if experts participate in decision-making concerning social issues.

The emergence of experts poses a problem for our democratic political system because there is no organizing framework. Jasanoff refers to scientific experts as the fifth branch; our constitutional repertoire reckons with three branches of government.

3 The debate in the Netherlands

In the Netherlands the modern discussion about the rightful place for scientific expertise in the democratic constitutional state is only ten years old. From the general perspective of steering at a distance, Hirsch Ballin observed in 1987 that security requirements of complex organizations concern material that is inherently not, or at least not adequately, pervious to legal rules aimed to change patterns of behavior. The lawmaker has little choice but to defer to technological norms established by the professions. From the perspective of consumer protection, Gerard Snijders in that same year investigated the incorporation of technological standards into the legal system. He reviewed the rules for products for which preventive safety tests are prescribed by law: electrotechnical products, passenger cars, pesticides and drugs. In addition, there are quality-control bureaus with no statutory basis that operate alongside the KEMA (Dutch quality-
control institute for electrical materials and appliances) in the domain of
gas and water supply equipment.

Snijders focuses on the various ways in which the law refers to technolo-
gical standards. He takes the position that the law-makers should always
have the last say if technological standards are to have the force of law.

Van Leeuwen\(^\text{17}\) examined the legal instruments such as the statutes
governing food and drugs, electricity, pesticides, dangerous substances,
environmentally hazardous substances. She, too, mentions the contribu-
tions of expertise. The legislative form is the focus of her dissertation writ-
ten at the University of Twente.

Further, jurists in the information technology field also figure promi-
nently in the discussion. Dommering,\(^\text{18}\) surprised at the lack of national
interest in the relationship between law and technology, sketches the
situation. He rightly does not limit his remarks to the influence of technol-
ogy on the law, but also examines the influence of law on the development
of technology. He distinguishes between the law’s direct and indirect in-
fluence.

In 1993 Smits chose standardization as the theme of his inaugural lec-
ture\(^\text{19}\) in Eindhoven. He placed a wake up call to lawyers who have a blind
spot for technological standardization. He argues in favor of a legislative
revival. Unless the lawmaker takes action, there is a danger that technology
will become law, a warning also sounded by Storme.\(^\text{20}\) Smits clearly as-
sumes that the lawmaker can regain lost ground.

Dorbeck-Jung\(^\text{21}\) considers standardization from the perspective of self-
regulation structured by law and subject to conditions. This approach
places more emphasis on the procedural role of the legislator. After all,
politics cannot regulate technology with respect to content and must
therefore limit itself to formulating the prerequisites.

In 1995 Stuurman upheld his dissertation\(^\text{22}\) at the Free University of
Amsterdam. The details of this substantial work focus on information
technology and telecommunications. Not only is his sketch of the national

\(^{17}\) van Leeuwen, K., *Juridische aspecten van produktveiligheid* [Legal Aspects of Product
Safety], Twente: 1990, dissertation.

\(^{18}\) Dommering, E.J., Recht, technologie en innovatie [*Law, Technology and Innovation*],

\(^{19}\) Smits, J.M., *Normalisatie: recht of techniek* [*Standardization: Law or Technology*], TU
Eindhoven 1993, inaugural lecture.

\(^{20}\) Storme, M., Bedrijfsjuristen bedrijven recht [*Corporate Lawyers Make Law*], in *Jurist in
bedrijf* [Jurist in Business], Brussels: Bruylant 1989, pp. 32–33.

\(^{21}\) Dorbeck-Jung, B., *Wettelijke geconditioneerde zelfregulering; symbolisch concept of
instrument met gevolgen?* [Self-regulation Subject to Legal Conditions, Symbolic Con-
cept or Instrument with Consequences?], in P. Eijlander et al. (eds), *Overheid en zelf-
Aliibi for Permissiveness or Incentive to Act], Zwolle: Tjeenk Willink 1993, pp. 141–154.

\(^{22}\) Stuurman, C., *Technische normen en het recht. Beschouwingen over de interactie tussen het
recht en technische normalisatie op het terrein van informatietechnologie en telecommunicatie*
[Technological Standards and Law. Law and Technological Standardization in Infor-
and international standardization process comprehensive and well documented, he also offers extensive comparative legal analysis in the various relevant areas of law. Stuurman treats a number of liability questions (the consequences of technological standards for the manufacturer in case of damage or injury), the competition perspective (the extent to which technological standards can be regarded as a cartel or technological trade barrier) and the legal protection of standards documents. He, too, thinks that the law can recover the sovereign position it merits by creating a legal framework, a Law of Standards.

This discussion was placed in a broader perspective by Serge Gutwirth in his broadly based and well-founded Belgian dissertation on legal theory. Drawing mainly on debates in the French language (Serres, Foucault) and on the legal theory developed by Foqué and 't Hart, he brings together on a theoretical level the claims to truth in scientific and technological discourse on the one hand and the legal debate on the other. In a very learned and inspiring manner Gutwirth denounces the dominant control-oriented thinking so characteristic of society today in which the complex formed by business, power and science exerts such an absolute claim to truth that few people can conceive of organizing society in any other way. 846 pages long Gutwirth eloquently protests against the tendency of scientists to proclaim the truths they find to be beyond the judgment of others. In a very lively exposition he criticizes the Irrefutable Certitudes that the scientific community holds up to the outside world. He sees science more as a journey, a voyage of discovery, a succession of imponderables. In the Enlightenment project that Gutwirth desires there is room for utopian ideas, the Other Story in which subjective self-determination by the individual and nature are not regarded as objects of control, oppressed by technocratic thinking so they do not stand a chance.

Contrary to the other authors mentioned, Gutwirth is not so much interested in the subordination of science to law — for here the search for truth and the quest for justice differ too much — as in the creation of a reflexive space leaving room for an alternative position that differs from the dominant technocratic position, for instance, the story of the human standard.

Finally, a word or two about the very insightful book Law and Chemistry. A Shotgun Wedding in Environmental Criminal Law by J.P. Hundersmarck. In this award-winning Master's thesis by an author who is versed in both law and chemistry a number of differences in style of argumentation between jurists and chemists become clear. He demonstrates the complexity of attuning the standardization of sampling regulations and rules of analysis. The world of the chemists differs enormously from that of the mathematicians who desire a certain exactness, but also from the criminal

---

23 Gutwirth, S., Waarheidsaanspraken in recht en wetenschap (Claims to truth in law and science), Bruxelles/Antwerpen: MAKLU, VUB Press 1993.
24 Amsterdam University, Centrum voor Milieurecht, Zwolle: Tjeenk Willink 1993.
jurists who are concerned with determining whether the requisite guilt of the suspect exists. As for the legal status of those who do the measuring, whether we are dealing with applied technology or scientific scholarship and research, Hundersmarck advises us not to lump together measurement technique, scientific research and speculative interpretation.

4 Europe as an example of undemocratic technocratic discourse

The European integration process is an attempt to establish cohesion between European markets, but it is also a fascinating experiment in making rules and scientific expertise compatible. There is a huge legal vacuum (democratic deficit) precisely because the political and democratic legitimization of Europe are so weak. But since European decision-making nonetheless requires legitimization, it is attractive for policy-makers to call in the help of experts.

European security policy began with the Seveso Guideline. The scientific veterinary committee played a decisive role in the recent BSE crisis and the permanent disagreement about the fishing quota takes place on the basis of measurements made by experts (biologists). The Securitel Affair once again harshly reminded the Dutch authorities how important a role technological standards play in EU competition policy. Initially, technological standards were regarded in European law as a covert means of imposing restrictions on competition.25

Owing to Europeanization of the legal order, the influence of experts in European standardization policy has also increased considerably. After 1992 the New Approach broke radically with the old system of establishing consensus through a process in which national governments and the relevant businesses, in dialogue with the Commission, slowly but surely produced one guideline after the other.26 The democratic legitimization of this manner of decision-making was high, but the tempo was dreadfully slow. This problem had an increasingly adverse effect the more European standardization came to be seen as a means of obtaining a strong position as Fort Europa capable of competing in the world market with the United States and the Asian Tigers. The motive for this movement toward standardization, then, is the creation of a homogeneous European market. This is an advantage for Dutch companies because it makes it possible to overcome the disadvantages of a small domestic market.27

Under the New Approach, Guidelines no longer contain detailed requirements to be met by products but the essential safety specifications stipulated by the (private) European Bureaus of Standards.

Owing to this style of quality-control, large European industries stand out as standard setters. They possess the expert knowledge necessary to establish authoritative standards. The participants pay for a considerable part of the costs incurred as a result of this standardization. The adage: ‘Those who pay have the say’ is really true here.

The New Approach leads to a new form of regulation: no longer does the government hand down decrees from above, standardization is now effectuated in networks dominated by Big Business. Companies like Siemens and Philips set the – generally high – standards to which smaller businesses must conform. The advantages are clear: 28

- mobilization of expertise from various disciplines;
- stimulation of the participating parties’ own interests;
- making the regulatory tasks of governments and Community easier;
- no strict, restrictive rules;
- little opportunity for public involvement;
- possibility for rapid and simple adjustment as technology advances;
- practice-oriented realistic solutions;
- a mixture of interests in the pluriform commissions;
- greater willingness to comply with the regulations because of one’s own involvement.

Here an idiosyncratic legal order develops that is not easily placed within the traditional constitutional framework of democracy ruled by politics and law. This poses the science of law with entirely new problems because the existing concepts are inadequate. 29 Joerges 30 characterizes Brussels as a laboratory where experiments in more associative forms of social regulation are being conducted. He seeks the answer in the direction of rethinking Komitologie (rule-making in Brussels by committees in conference rooms closed to the public). In his view we must design procedures that do more justice to weakly represented interests: small business, labor unions,

---

environmental and consumer organizations. By giving them a say the standardization process would gain greater acceptability.

5 Normative regulation of standardization

Looking at standardization purely from the perspective of the representative democracy and the rule of law, this form of regulation has a number of fundamental shortcomings. There is little doubt about it – the democratic legitimization of the new European approach is flimsy. For this reason, many lawyers are inclined to deny force of law to standardization which does not satisfy sound legal jurisdictional rules based on state law.

In that case the law judges technology according to its own terms of reference. This is far too rigid an approach in my view. From Teubner, among others, we learn that the possibilities for legal intervention in the area of technological development are extremely limited. The law cannot impose its values on technology any more than the natural sciences can judge the law according to its terms. If both parties in the debate think they have a monopoly on truth, this undeniably results in a dialogue between the deaf.

Confining myself for the remainder of this paper to the role of the law and lawyers, I think that proceeding from a relational legal concept, we must work toward attaining an open attitude with respect to the self-regulating capacity of science and technology. For this reason lawyers need to expand their constitutional legal concept. Traditional law is inadequate if society wants to steer technological social developments. In the search for an adequate legal concept the tripartite division Robert Post makes can be useful. He tries to make the law more responsive, give it more social power of expression. According to Post, the legal order gives meaning to three dimensions of social organization: community, management and democracy. In the first place, the law creates community by trying to interpret the authoritative shared values and norms. The focus on shared values implies that there must be a minimal consensus. This is a function of the law that is so important for social cohesion.

Second, citizens also want the law to be effective. Fellow-citizens expect a certain degree of probability that particular goals that the law says it serves will in fact be attained. And third, the law is inspired by democratic ideas, namely by establishing a social arrangement that makes possible a process of collective self-determination.

For our subject, it is important to ascertain that three of the constitutional domains distinguished by Post have a place and that all are insepa-

rable from the collective project of society. We are at present living in a period dominated by managerial thinking, both at the European and the national level. But the European Union is no business and a nation does not allow itself to be governed by a cookie company. If Europe desires to be more than a market and currency (Euro), the other two dimensions (community and democracy) must be given a more prominent position. If there is to be cohesion at the European level, the European integration process must expand to a social and democratic Europe.

Lawyers must therefore adopt a critical attitude toward the technocratic European legal order that is taking shape, a legal order in which only government leaders, technocrats in Brussels and leaders of large companies participate. They must develop procedures that make more room for the communal aspect and democratic content of standardization. Inspired by Marburger, I suggest the following requirements:

1. The most advanced expertise should be represented on the committees in order to avoid unnecessarily obstructing innovation. Independent counter-expertise are part of the procedure. Experience teaches us that timing standard setting well is no simple matter.

2. The relevant interests must be represented in the procedure. Poorly represented and diffuse interests such as the environment or consumer affairs must not be neglected.

3. The public must have the possibility to influence the content of standards. Much more publicity is needed.

References


Cliteur, P. et al. (eds), Sociale cohesie en het recht (social cohesion and the law), Lelystad: Vermande 1998.


36 This term is related to the work of N. Reich, Europäisches Verbraucherrecht. Eine problemorientierte Einführung in das Europäische Wirtschaftsrecht, Teil 3. von Schutz und Förderung diffuser Interessen durch die Europäische Gemeinschaft [European Consumer Law. A Problem-Oriented Introduction to European Economic Law, Part 3 Protection and Advancement of Diffuse Interests by the European Community], Baden-Baden: Nomos 1996.
Chapter IV: Quality


Gutwirth, S., Waarheidsaanspraken in recht en wetenschap (Claims to truth in law and science), Bruxelles Antwerpen: M&RU, VUB Press 1993.


Hirsch Bailin, E.M.H., 'Regelen op afstand als vereiste van een sociale rechtsstaat' [Regulation at a Distance as Requirement in a Social State Ruled by Law], in: M. Bovens et al. (eds), Rechtsstaat en steuring [Steering in a State Ruled by Law], Zwolle: 1987, p. 100.


6 Forensics and Quality in the 21st Century

Iris de Kwant

1 Introduction

Over the last 20 years a 'quality revolution' has taken place in Europe. Interest in quality has increased tremendously due to developments on the international market. Companies are trying to stand out by offering higher quality products or services and customers demand good quality, price and delivery time. Whereas in the 1960s the most important aspect of a product was the price, because of the growing prosperity and dependence on well-functioning products, the quality of the product became equally important. By the end of the seventies the market also demanded service and a variety of products. The product had to be up to date and meet the client's wishes.

In the eighties the pharmaceutical industry was the first to realise that in order to meet market demands, a quality system was necessary. To this end, a set of recommendations, called 'Good Laboratory Practice', was created for the setting up and maintenance of a laboratory quality assurance system. Soon after this, commercial industry followed. This was undoubtedly inspired by successes in Japan where, among others, Deming's approach to quality, in the form of the 'plan-do-check-act cycle' was used. It was demonstrated that the use of a quality system could lead to high-quality products at competitive prices.

Finally, in the nineties government organisations, including the forensic institutes, joined in the quality revolution. It was clear to them that having a quality system could be of help in distinguishing the organisation from the competition. This might seem of little importance for forensic institutes, since they often have more or less a monopoly position, but it is not inconceivable that other laboratories may try to corner a new piece of the market that up to now has been covered by the forensic institute. In addition, a quality system is especially important for forensic institutes, because

---


Chapter IV: Quality

having an established clientele and lacking competition with other organisations, the importance of quality may well be forgotten. A quality system can be a good measure to ensure that people do not lose sight of the decisive role that forensic investigation can play in criminal cases. Furthermore a factor that, in my opinion, could contribute to the need for a quality system is the more critical attitude of defence lawyers towards the evidence in criminal cases. Working according to a quality system can add weight to the expert's testimony and the results of the investigation. Another possible reason for the need for a quality system is that national law may require that only laboratories with an acknowledged quality system do certain analyses. A good example of such a requirement is the Dutch law on DNA. This states that the outcome of DNA testing can be used as evidence only if it is carried out by the Dutch forensic science laboratory (NFI) or the laboratory of the University of Leiden, because they have been accredited by the Dutch Council of Accreditation.

However, laws can never be the basis for a good quality system. To quote quality guru Crosby: "Crime is not prevented by the police department, although having one makes criminals think harder. Crime is prevented by eliminating the need for it and the acceptance of it. The same is true with quality. Laws and discipline are helpful, but integrity and fair dealing are the keys."

In 1987 the International Organisation for Standardisation (ISO) introduced the ISO 9000 series to create internationally-recognised standards for quality systems. In Europe a comparable set of standards was developed by the Commune Européenne de Normalisation (CEN). Within these series of standards a distinction can be made between organisational and technical standards. ISO-guide 25 and EN 45001 combine these two aspects so that a specific standard for laboratories is created. The need for special laboratory standards is obvious: crucial aspects of laboratory tests, such as the use of chemicals and reference materials, calibration and maintenance of equipment, are not met in more general standards for quality systems. The use of these technical standards is of great importance in the forensic world, since most customers, who are generally lawyers and judges without a technical background, are not able to recognise

4 The subject of accreditation will be covered in paragraph 4 of this article.
6 This ISO-guide contains general requirements for the competence of calibration and testing laboratories. It consists of the requirement of the ISO 9000 series of standards, including the model described by ISO 9002, since the laboratories operate as producers of calibration and test results.
7 This EN-standard for testing laboratories and certification bodies is drawn up after appropriate preparatory work by member states and the EC commission with reference to analogous international work by ISO. A quality management system based on EN 45001 has two aspects: a more general one and one concerning specific expertise. The EN 45001 standard was originally meant for testing laboratories, which performed repetitive test (objective testing).
the correctness of the reports. Moreover, the forensic institute does not simply sum up test results, it also gives an interpretation of these results. Where the quality of the products and services (such as reports, conclusions, and interpretations) depends for a large part on the skills of the forensic expert, these skills will have to meet certain requirements. In this light it is not surprising to see the trend that has developed in European forensic institutes to place more attention on the training requirements for forensic experts.

The increasing attention to quality was the primary reason for investigating the present state of quality in European forensic institutes and the possibilities for harmonisation in this area. In this article I will discuss the results of this research. The following institutes are respondents:

Austria: Ministry of the Interior – Department of Forensic Sciences;
Institute of Forensic Medicine University of Vienna;

France: Forensic Research Institute of the French Gendarmerie, Rosny Sous Bois;
Laboratoire de Police Scientifique, Lille;

Germany: Bundeskriminalamt (BKA), Wiesbaden;
Institut fur Rechtsmedizin, Münster;

Latvia: Latvia Forensic Science Laboratory, Riga;

Netherlands: Nederlands Forensisch Instituut (NFI), Rijswijk;
Technical Police, Utrecht;

Poland: Institute of Forensic Research, Warsaw;

Russia: Russian Federal Centre of Forensic Sciences, Moscow;

Slovakia: Kriminalistiky a Expertizny Ustav Sklabinska, Bratislava;

Spain: Comissaria General Policia Cientifica Servicio Central de Investigacion Tecnica, Madrid;
Dirección General de la Guardia Civil, Madrid;
Instituto de Toxicología, Madrid;

Sweden: National Laboratory of Forensic Science (SKL), Linköping;

Turkey: Gendarmerie Regional – Criminal Department, Sube Mdlugu;
Gendarmerie Regional – Criminal Department, Daire Baskanligi;
Turkish Central Criminal Police laboratory, Istanbul;

2 Definitions of quality

The word ‘quality’ is used in many different ways. Webster’s dictionary enumerates, among others, the following definitions of the word:

Chapter IV: Quality

3. character with respect to grade of excellence or fineness;
4. superiority; excellence; (...) 
6. an accomplishment or attainment; (...) 
14. producing or providing products or services of high quality”.

In literature on quality there is an even further divergence. Blauw\(^9\) discerns between five different approaches to quality:
1. The transcendent approach, in which quality is considered to be natural excellence;
2. The product approach, in which quality consists of exact and measurable variables;
3. The user approach, in which user and user-situation take a central position;
4. The production approach, in which the emphasis is laid on the conformity of the product to its requirements;
5. The value approach, in which quality is defined in terms of user-demands and price.

In Crosby’s opinion the lack of an agreed definition is the biggest problem in accomplishing quality management.\(^{10}\) It is therefore important to pause and consider what definitions are used in practice in the forensic world.

Most respondents state that quality means obtaining investigation results in a way that meets the requirements of a certain standard. Austria (Ministry of the Interior), France (Gendarmerie) and Sweden (SKL) use the ISO 8402 standard. The Netherlands (NFI) and Turkey (Gendarmerie) name the EN standard, while Germany (BKA) considers the TQA-standard\(^{11}\). In this context it is interesting to note the definition of quality according to ISO: “quality is the degree to which all the properties of a product, process or service meet the requirements imposed on them as a result of the intended purpose.” This definition is similar to the answer of the respondents, who define quality as the obtaining of reliable results, or even ‘truth finding’.\(^{12}\) Unfortunately these respondents did not explain which standard this is measured against, although the Turkish Central Criminal Police Laboratory considers only the results obtained through application of internationally accepted investigation methods to be reliable.

According to the Dutch technical police, the Spanish Gendarmerie and the forensic institute in Slovakia, quality implies satisfying the needs of the customers. In my opinion, one must be careful when using such a definition. Definitions like this originate from general quality ideas used in commercial businesses and cannot always be applied directly to forensics. The clients of forensic institutes (mainly police, public prosecutors and

---

11 TQM stands for Total Quality Management.
12 Russia (Federal Centre of Forensic Science), Spain (Inst. de toxicología), France (Lab. de police scientifique) and Turkey (central police laboratory).
judges, but also suspects) may have requirements regarding, for example, the delivery time of the report. However, their wishes could also pertain to the contents of the report. If compliance with these wishes conflicts with the impartiality of the forensic institute, 'satisfying the customer' is not quality. This problem could be prevented by integrating requirements into the quality system that can act as a safeguard for the integrity of the organisation. For this reason the Dutch Council of Accreditation uses, amongst other things, the criteria of impartiality, independence and integrity for granting accreditation.

Another problem that arises when general theories about the supplier-customer relationship are applied is the following: since clients of the forensic industry do not have to pay for the product, they are not in a position to ensure that their demands are met. This is of particular importance in view of what is known as the chain perspective. The laboratory generally receives the materials to be tested (exhibits) from the police. If samples are not properly collected by the police, this in turn affects the quality of the laboratory test results. Yet just as an automobile factory may be held responsible for a car which does not perform because of faulty parts delivered by the supplier, the forensic institute can be held responsible if the technical police deliver contaminated or poorly-collected samples.

In this area a quality system based on Total Quality Management can play an important role. This system focuses not only on the standardisation of the whole production process, but also takes into account the chain of processes. The different departments within the forensic institute, which can be seen as different parts of this chain, have to make agreements and follow them. An example of such agreements in the forensic institute is the procedure for the entry of exhibits and cases and their transfer to other departments. In the Dutch NFI all new exhibits and cases come in to the administrative department 'zakenbeheer', where they are registered and provided with a code number. Here it is decided which department the exhibit should be transferred to for investigation. This transfer is also registered on a special form and receipt of the exhibit has to be acknowledged. The same applies when the exhibit is transferred to another department. When no more investigation is needed, the exhibit returns to the administrative department. A similar procedure applies to the writing of expert reports. In this way there is a constant level of quality throughout the whole process. Another example of TQM is the agreement made between the forensic institute and the technical police about a standard procedure for collecting crime scene evidence. In the Netherlands this has led to written procedures for investigation on the crime scene by the technical police, called Forensic-Technical standards (FT-standards).
3 Quality control, quality assurance and quality management

What method can be used to establish the desired level of quality in an organisation? This is described by the term quality control. Quality control can be best defined as “an effective system for integrating the quality-development, quality-maintenance, and quality-improvement efforts of the various groups in an organization so as to enable production and service at the most economic levels which allow for full customer satisfaction”. In forensic institutes this consists of, among other things, operations undertaken to ensure that the data produced are generated within known probability limits of accuracy and precision and that these can be reproduced. Thus the actual level of accuracy and precision is not relevant. What is important is that they are known to a certain level of confidence; in a laboratory it is of no value to generate data with a higher degree of accuracy than necessary. For example, a forensic DNA expert will not have to profile the whole DNA strand. A small part of the DNA is profiled by means of 8 markers, yet this is enough to allow for conclusions with a probability bordering on certainty.

When a certain level of quality is reached, it is crucial to maintain this level. This is in essence the role of quality assurance. Quality assurance consists of the system whereby the laboratory can assure clients that the laboratory is generating data of proven and known quality. It demonstrates that the quality control operations are actually being carried out and assures accountability of the data, and that the data reported do in fact represent analysis of the sample as submitted or collected. Furthermore it assures traceability. For example, who ran the test, the method and instrument used and the status of the quality control system at the time the sample was run. It is also important for forensic institutes that the system demonstrates that reasonable precautions are being taken against the possibility of falsification of data.

In practice, quality assurance systems of the respondents are based either on the EN 45001 standard or on the ISO 17025 standard. GLP is also mentioned in this connection. The quality assurance system often contains guidelines for the various investigation subjects.

14 Most respondents to the questionnaire however, only state that quality control is the method that is used to meet the current standard, without specifying how this is done. Only the Turkish central police laboratory has a dissenting definition: quality control is achieved through external control by an independent, international institute.
16 See Dux, J.P., op. cit., pp. 4-5.
17 France (Gendarmerie), Germany (BKA), Netherlands (NFI), Sweden (SKL) and all Spanish respondents.
18 As stated earlier, ‘Good Laboratory Practice’ comprises recommendations for the setting up and maintenance of a laboratory quality assurance system that is compliant with ISO guide 25 and complementary to the general criteria of EN 45001 for specialised chemical
Exceptions are shown in table 1.

**Table 1  Subjects not regulated by guidelines**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Not regulated by guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisation and personnel</td>
<td></td>
</tr>
<tr>
<td>Quality handbook</td>
<td>Turkey (central criminal police lab)</td>
</tr>
<tr>
<td>Own evaluation quality system</td>
<td>Turkey (central criminal police lab)</td>
</tr>
<tr>
<td>Supplies and assets</td>
<td>Spain (Inst. de toxicologia), Russia</td>
</tr>
<tr>
<td>Bought-in goods and services</td>
<td>Germany (Inst. fur Rechtsmedizin), Russia, Spain (Inst. de toxicologia)</td>
</tr>
<tr>
<td>Management and use of investigation and reference objects</td>
<td></td>
</tr>
<tr>
<td>Work regulations</td>
<td>France (Gendarmerie), Germany (Inst. fur Rechtsmedizin)</td>
</tr>
<tr>
<td>Performance of investigation</td>
<td>France (Gendarmerie), Germany (BKA), Netherlands (NFI)</td>
</tr>
<tr>
<td>Interpretation</td>
<td></td>
</tr>
<tr>
<td>Report</td>
<td></td>
</tr>
<tr>
<td>Record documentation</td>
<td></td>
</tr>
<tr>
<td>Record means of investigation and objects</td>
<td></td>
</tr>
<tr>
<td>Education and training of experts</td>
<td>Germany (Inst. fur Rechtsmedizin)</td>
</tr>
</tbody>
</table>

Forensic institutes can use different measures to reach the objectives of the quality assurance system. Respondents name, among other things, internal or external training of personnel with written standards of competency. This is an extremely important measure because the quality depends strongly on the professional skills of the individual forensic researcher, particularly since forensic experts have to interpret data produced in connection with the crime.

Another measure is participation in the training of scene of crime officers and of technical police officers. As stated above, the quality of the outcome of the laboratory investigation depends for a large part on the quality of the sample investigated. When forensic researchers can participate in the training, they can explain the way in which a sample should be collected and why. Agreements made between the police and the labora-

---

19 Germany (Inst. fur Rechtsmedizin and BKA), Latvia, Netherlands (NFI), Russia, Slovakia, Spain (Inst. de toxicologia, police lab and Gendarmerie), Turkey (Gendarmerie and central criminal police lab).

20 Austria (Inst. of forensic medicine, university), France (Gendarmerie and lab de police scientifique), Latvia, Netherlands (NFI and police), Russia, Slovakia, Spain (police lab), Turkey (Gendarmerie and central criminal police lab).

21 Austria (ministry of the interior), Latvia, Netherlands (NFI and police), Spain (Guardia Civil and police lab), Turkey (central criminal lab).
Chapter IV: Quality

tory should be laid down in written procedures for investigation, so there is clarity and the chances of mistakes are minimised.22

Internal audits23 and periodical external audits24 can also be mentioned here. An audit is a systematically executed inspection to determine whether activities in the area of quality and the outcome correspond with the planned measures. The aim is to evaluate whether the measures are suitable to attain the objectives. Procedures, working instructions and job descriptions are examined and evaluated.25

A classic means for forensic institutes to check whether the receiver of the reports values the product and considers it usable (especially when there is no price to be paid for the product or service) is a complaint procedure.26 However, the information resulting is scant as this measure places the initiative with the customer. In my opinion, a more active approach on the part of the forensic institute in measuring customer satisfaction would be far more useful, not only because the response would probably be higher, but also because the information would be more extensive. The measurement could take place by enclosing a questionnaire with each expert report containing questions about, for instance, the clarity of the report, the speed of the investigation, etc.

After establishing and maintaining the desired level of quality, the next important step is constant improvement of quality. This allows the forensic institute to react to a quickly changing environment and keep up with the latest techniques in investigation. The concept for quality improvement by Deming, called the ‘plan-do-check-act cycle’ is widely used. It assure that the output of the process remains under control. This is accomplished by direct checking of the outputs and corrective actions where needed. This system will not, however, prevent errors within the process. They will appear and be corrected, but re-appear from time to time.

For this reason Guus de Kwant27 created a concept based on quality management principles rather than on quality assurance principles. This concept is called the ‘proactive continuous improvement cycle’ and consists of four steps / actions. The first step is the operating and control action, which corresponds with Deming’s cycle. This is followed by the evaluation step, which deals with the analyses of the checking data from

22 Written procedures for investigations are used in Austria (Ministry of the Interior), France (Gendarmerie and lab de police scientifique), Germany (Institut fur Rechtsmedizin and BKA), Latvia, Netherlands (NFI and police), Russia, Slovakia, Spain (Inst. tox., Guardia Civil and police lab), Sweden, Turkey (Gendarmerie and central lab).

23 France (Gendarmerie), Germany (Institut fur Rechtsmedizin and BKA), Latvia, Netherlands (NFI and police), Russia, Spain (Inst. de toxicologia and Guardia Civil), Sweden, Turkey (central lab).

24 Austria (Institute of forensic medicine, university), Latvia, Netherlands (NFI), Russia, Spain (Guardia Civil), Sweden, Turkey (central lab).


26 France (Gendarmerie), Latvia, Netherlands (NFI and police), Russia, Slovakia, Spain (Guardia Civil), Sweden.

27 Guus de Kwant, Quality Management Concept.

384
action 1, so that structural improvement opportunities can be determined. The third action consists of the use of performance standards. This is the most difficult action, because it requires guidance from the executive(s) of the organisation. It involves proper usage of the mission statement, corporate values, strategy and goal setting. If organised properly this action will bridge the gap between evaluation and improvement of quality. The final action relates to this improvement, where time needs to be invested in preventing errors by eliminating root causes. If the latter is executed well, the first action (operating and control) will benefit because the performance in terms of efficiency and consistency of the operation-process has improved.

The new revised ISO standard (ISO 9001: 2000), which comes into force in the year 2000, places more emphasis on quality management than does the present ISO standard. Consequently, using a management based quality system will become a requirement.

4 Accreditation

To be acknowledged as a forensic institute delivering high-quality, state of the art products and services, the organisation should be accredited. Laboratory accreditation is the verification by a competent and disinterested third party that a laboratory possesses the capability to provide accurate test data and that it can be relied upon in its day to day operations to maintain high standards of performance. The criteria used for accreditation can be education of the personnel, training and experience in performing the tests, adequate facilities for performing the tests, appropriate instrumentation for the range of tests, maintenance of the instrumentation, and a quality assurance program with a written manual.

The need for laboratory accreditation was first felt by the independent commercial testing laboratories who were often underbid by less professional competitors. On the other hand, the clients were often technically naive and unable to distinguish between the capabilities of the two classes of laboratories. Accreditation was seen as useful both for high-quality laboratories and for the clients. The second group that became aware of the advantages of being accredited was the regulatory government agencies.

In recent years, several forensic institutes have been accredited or are in the process of obtaining accreditation. Examples of institutes accredited for the general quality system are the forensic institutes in the Netherlands, England and Wales, Finland, and Russia. The Dutch NFI has been accredited since January 1994. In the Netherlands accreditation takes place by an organisation called STERLAB (a part of the Dutch Council for Accreditation). Although STERLAB is a national council for accreditation, it uses European criteria (EN 45001). Accreditation was given for the organisational aspect and consists among other things of recording of analysing

Chapter IV: Quality

and test methods, written procedures and work regulations, calibration systems, organising quality courses, standardising expert reports, developing a documentation system and performing internal audits.30

The Russian Federal Centre of Forensic Science is also accredited as a whole. According to the Russian respondent, accreditation takes place by way of an edict from the president and a statement from the government. Unfortunately it is not clear on which standards this accreditation is granted.

The German Institut für Rechtsmedizin, the Spanish police laboratory and Instituto de Toxicología, and the Turkish Gendarmerie are still in the process of obtaining accreditation. The Swedish National Forensic Laboratory has already obtained accreditation for its organisation units, and the various methods of investigation were evaluated in 1999. In Spain future accreditation will be done by the national accreditation institute ENAC (Entidad Nacional de acreditacion), in Sweden by the SWEDAC (Swedish board for Accreditation and conformity assessment).

Nearly all respondents who strive after accreditation wish to employ the EFQM (European Foundation in Quality Management) model.31 This model was developed within the framework of TQM and emphasises the chain perspective mentioned earlier.

In addition to this form of accreditation, accreditation can also be obtained for the specific methods of investigation. Table 2 shows the current state of affairs as given by the respondents.

---

30 See Neuteboom, W., Kwaliteit in het Gerechtelijk Laboratorium, Modus 1992, p. 56.
31 Austria (Institute of forensic medicine, university), France (Gendarmerie) Latvia, Netherlands (NFI), Russia, Slovakia, Turkey (central lab and Gendarmerie).
<table>
<thead>
<tr>
<th>Investigation</th>
<th>Accredited</th>
<th>Expected within 1–2 years</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicology</td>
<td>Netherlands (NFI)</td>
<td>Germany (Inst. fur Rechtsmedizin), Spain (Inst. de toxicologia), Turkey (Gendarmerie), France (lab de police scientifique)</td>
<td>Netherlands (NFI): EN 45001 Spain (Guardia Civil), Sweden: not performed</td>
</tr>
<tr>
<td>Drugs</td>
<td>Netherlands (NFI), Russia, Sweden</td>
<td>Germany (Inst. fur Rechtsmedizin), Spain (Inst. de toxicologia), Turkey (Gendarmerie)</td>
<td>Netherlands (NFI), Sweden: EN 45001 Spain (Guardia Civil): not performed</td>
</tr>
<tr>
<td>DNA</td>
<td>Netherlands (NFI), Sweden</td>
<td>Germany (Inst. fur Rechtsmedizin), Spain (Inst. de toxicologia, Com. General Policia, Guardia Civil), Turkey (Gendarmerie), France (lab de police scientifique)</td>
<td>Netherlands (NFI), Sweden: EN 45001</td>
</tr>
<tr>
<td>Paint</td>
<td>Netherlands (NFI), Russia, Sweden</td>
<td>Spain (Guardia Civil), Turkey (Gendarmerie)</td>
<td>Netherlands (NFI), Sweden: EN 45001</td>
</tr>
<tr>
<td>Fingerprints</td>
<td>Netherlands (NFI), Russia, Sweden</td>
<td>Spain (Guardia Civil), Turkey (Gendarmerie)</td>
<td>Netherlands (NFI), Sweden: EN 45001 France (lab de police scientifique): not performed</td>
</tr>
<tr>
<td>Toolmarks</td>
<td>Netherlands (NFI), Russia, Sweden</td>
<td>Spain (Guardia Civil), Turkey (Gendarmerie)</td>
<td>Netherlands (NFI), Sweden: EN 45001</td>
</tr>
<tr>
<td>Footprint</td>
<td>Sweden</td>
<td>Spain (Guardia Civil), Turkey (Gendarmerie)</td>
<td>Sweden: EN 45001</td>
</tr>
<tr>
<td>Traffic accidents</td>
<td>Netherlands (NFI), Russia</td>
<td>Germany (Inst. fur Rechtsmedizin)</td>
<td>Netherlands (NFI): EN 45001 France (lab de police scientifique), Sweden, Turkey (Gendarmerie): not performed</td>
</tr>
<tr>
<td>Computer</td>
<td>Netherlands (NFI), Russia</td>
<td>Spain (Guardia Civil), Sweden</td>
<td>Netherlands (NFI):EN 45001 France (lab de police scientifique), Turkey (Gendarmerie): not performed</td>
</tr>
<tr>
<td>Investigation</td>
<td>Accredited</td>
<td>Expected within 1-2 years</td>
<td>Explanation</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Speech</td>
<td>Russia</td>
<td>Spain (Guardia Civil, Com. General Policia), Sweden, Turkey (Gendarmerie)</td>
<td>France (lab de police scientifique): not performed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spain (Com. General Policia): expected within 3-4 years</td>
</tr>
<tr>
<td>Gunshot residues</td>
<td>Netherlands (NFI), Russia, Sweden</td>
<td>Spain (Guardia Civil), Turkey (Gendarmerie)</td>
<td>Netherlands (NFI), Sweden: EN 45001</td>
</tr>
<tr>
<td>Firearms</td>
<td>Netherlands (NFI), Russia, Sweden</td>
<td>Spain (Guardia Civil), Turkey (Gendarmerie), France (lab de police scientifique)</td>
<td>Netherlands (NFI), Sweden: EN 45001</td>
</tr>
<tr>
<td>Documents</td>
<td>Netherlands (NFI), Russia, Sweden</td>
<td>Spain (Guardia Civil), Sweden, Turkey (Gendarmerie)</td>
<td>Netherlands (NFI):EN 45001</td>
</tr>
<tr>
<td>Handwriting</td>
<td>Netherlands (NFI), Russia, Sweden</td>
<td>Spain (Guardia Civil), Turkey (Gendarmerie)</td>
<td>Netherlands (NFI), Sweden: EN 45001</td>
</tr>
<tr>
<td>Hair</td>
<td>Netherlands (NFI)</td>
<td>Spain (Guardia Civil, Com. General Policia), Germany (Inst. fur Rechtsmedizin), Turkey (Gendarmerie), Sweden</td>
<td>Netherlands (NFI):EN 45001 Spain (Com. General Policia): expected within 3-4 years</td>
</tr>
<tr>
<td>Fibres</td>
<td>Netherlands (NFI), Russia, Sweden</td>
<td>Spain (Guardia Civil, Com. General Policia), Turkey (Gendarmerie)</td>
<td>Netherlands (NFI), Sweden: EN 45001 Spain (Com. General Policia): expected within 3-4 years</td>
</tr>
<tr>
<td>Environmental</td>
<td>Netherlands (NFI)</td>
<td>France (Gendarmerie), Spain (Guardia Civil)</td>
<td>Netherlands (NFI), France (Gendarmerie): EN 45001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>France (lab de police scientifique), Sweden, Turkey (Gendarmerie): not performed</td>
</tr>
<tr>
<td>Glass</td>
<td>France (Gendarmerie), Russia, Sweden</td>
<td>Spain (Guardia Civil, Com. General Policia)</td>
<td>Sweden: EN 45001 Spain (Com. General Policia): expected within 3-4 years</td>
</tr>
</tbody>
</table>
Comparable to accreditation is certification. While the first notion is limited to organisations, the latter pertains to individuals or products. As mentioned before, forensic institutes have come to place more attention on training requirements for experts in recent years because quality depends largely on the professional skills of the experts. Certification can be a good measure for guaranteeing a certain level of skill.

As an example of this, the French regulation on DNA investigations can be mentioned. Only persons with consent from the ‘commission agrément’ are permitted to work on these investigations. This commission consists of biologists and members of the Ministry of Justice. The appointed persons are registered on a list. In this connection some countries require that certain investigations only be carried out by a laboratory with an acknowledged quality system. This can be seen in Sweden with regard to the inspection of breath alcohol instruments. The above mentioned requirement also applies to environmental investigations in France and the Netherlands. In addition, in the Netherlands DNA testing can be used as proof only when carried out by an accredited laboratory.

Sometimes the certification, and with it authorisations such as signing reports or appearing in court, carries a time limit. After the expiration of the authorisation, the forensic expert’s professional skills should be tested to ensure that they are still up to date. A similar requirement is that the certified expert covers a certain number of cases each year.
Chapter IV: Quality

5 Proficiency testing

One way of measuring and comparing the level of quality in forensic institutes is proficiency testing. This method originates from analytical chemistry. Forensic institutes receive identical samples for investigation. The results are reported to the institute initiating the test, after which the correct analysis results are made known to the participants.

Table 3 Proficiency testing with other labs

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Proficiency testing with other laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicology</td>
<td>France (Gendarmerie): controlled substances analysis in urine and blood.</td>
</tr>
<tr>
<td></td>
<td>Germany (Inst. fur Rechtsmedizin), Slovakia: alcohol in blood</td>
</tr>
<tr>
<td></td>
<td>Spain (Inst. de toxicologia), Poland: heavy metals in blood and drug analysis in urine</td>
</tr>
<tr>
<td>Drugs</td>
<td>Spain (Inst. de toxicologia), Slovakia, France (Gendarmerie), Germany (Inst. fur Rechtsmedizin), Netherlands (NPF), Sweden</td>
</tr>
<tr>
<td>DNA</td>
<td>Germany (Inst. fur Rechtsmedizin and BKA), Turkey (Gendarmerie), Spain (Inst. de toxicologia, com. general policia), Slovakia, France (Gendarmerie)</td>
</tr>
<tr>
<td>Paint</td>
<td>Spain (Inst. de toxicologia), Germany (BKA), France (Gendarmerie)</td>
</tr>
<tr>
<td>Fingerprints</td>
<td>Spain (Inst. de toxicologia), Germany (BKA), France (Gendarmerie)</td>
</tr>
<tr>
<td>Toolmarks</td>
<td>Germany (BKA), France (Gendarmerie), Spain (Inst. de toxicologia)</td>
</tr>
<tr>
<td>Footprints</td>
<td>France (Gendarmerie)</td>
</tr>
<tr>
<td>Traffic Accidents</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td></td>
</tr>
<tr>
<td>Speech</td>
<td></td>
</tr>
<tr>
<td>Gunshot residues</td>
<td>France (Gendarmerie), Germany (BKA)</td>
</tr>
<tr>
<td>Firearms</td>
<td>France (Gendarmerie)</td>
</tr>
<tr>
<td>Documents</td>
<td>France (Gendarmerie), Spain (Inst. de toxicologia)</td>
</tr>
<tr>
<td>Handwriting</td>
<td>France (Gendarmerie), Spain (Inst. de toxicologia)</td>
</tr>
<tr>
<td>Hairs</td>
<td>France (Gendarmerie)</td>
</tr>
<tr>
<td>Fibres</td>
<td>France (Gendarmerie), Germany (BKA), Spain (Inst. de toxicologia)</td>
</tr>
<tr>
<td>Environmental</td>
<td>France (Gendarmerie)</td>
</tr>
<tr>
<td>Glass</td>
<td>France (Gendarmerie)</td>
</tr>
<tr>
<td>Arson: flammable residues</td>
<td>France (Gendarmerie), Spain (Inst. de toxicologia)</td>
</tr>
<tr>
<td>Arson: technical causes</td>
<td></td>
</tr>
<tr>
<td>Bloodstain patterns</td>
<td>France (Gendarmerie)</td>
</tr>
</tbody>
</table>

Proficiency tests can be carried out in various ways and may, in some laboratory branches, be compulsory, with sanctions if particular accuracy re-
quirements are not met. With voluntary participation, the samples may be submitted blind by the supervisor. The laboratory generally receives a full report, with statistical analysis, including the data from all the participating laboratories.  

In practice, proficiency testing is rare in police forces. An exception is Germany, where police officers take part in proficiency testing in several areas of expertise (drugs, paint, handwriting, hair, footprints and arson investigation (on flammable residues and technical causes)). The same is true of Dutch police forces in the area of footprint investigation.

Proficiency testing among laboratories is carried out much more frequently, as table 3 shows.

It is interesting to note that in the youngest areas of expertise (computer investigation and speech investigation) and in the area of traffic accident investigation no proficiency testing is yet being carried out.

The following table shows which (inter)national institutes are used to initiate the proficiency testing.

---

Table 4  Institutes proficiency testing

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Institutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicology</td>
<td>France (Gendarmerie, lab de police scientifique): SFTA (Souete Francaise de toxicology)</td>
</tr>
<tr>
<td></td>
<td>France (Gendarmerie), Spain (Inst. de toxicologia): UNDCP</td>
</tr>
<tr>
<td></td>
<td>Germany (Inst. fur Rechtsmedizin): GTFGTL</td>
</tr>
<tr>
<td></td>
<td>Spain (Inst. de toxicologia): CAP</td>
</tr>
<tr>
<td></td>
<td>Poland: CTS (Collaborative Testing Service, USA), KKGT (Institute of occupational medicine)</td>
</tr>
<tr>
<td></td>
<td>France (lab de police scientifique): BLT (Toxicology society of Belgium and Luxembourg)</td>
</tr>
<tr>
<td>Drugs</td>
<td>Austria (Ministry of Interior), Sweden, Poland, France (lab de police scientifique): CTS</td>
</tr>
<tr>
<td></td>
<td>Austria (Ministry of Interior), Netherlands (NFI), Spain (Inst. de toxicologia) ENFSI drug group</td>
</tr>
<tr>
<td></td>
<td>France (Gendarmerie): SFTA, UNDCP, LPS</td>
</tr>
<tr>
<td></td>
<td>Germany (Inst. fur Rechtsmedizin): GTFGTL</td>
</tr>
<tr>
<td></td>
<td>Germany (BKA), Slovakia, Spain (Inst. de toxicologia), Sweden, Turkey (Gendarmerie, central criminal police lab): UNDCP, BKA</td>
</tr>
<tr>
<td></td>
<td>France (lab de police scientifique): NFI</td>
</tr>
<tr>
<td>DNA</td>
<td>France (Gendarmerie), Spain (Inst. de toxicologia), Sweden, Poland, France (lab de police scientifique): CTS</td>
</tr>
<tr>
<td></td>
<td>Austria (Inst. of for. Medicine): OQUASTA</td>
</tr>
<tr>
<td></td>
<td>Austria (Inst. of for. Medicine), Germany (BKA, Inst. fur Rechtsmedizin), Slovakia: GEDNAP</td>
</tr>
<tr>
<td></td>
<td>France (Gendarmerie): AHIF (France)</td>
</tr>
<tr>
<td></td>
<td>Germany(Inst. fur Rechtsmedizin, BKA), Sweden: EDNAP</td>
</tr>
<tr>
<td></td>
<td>Spain (Com. General Policia): ISFHS (Spanish – Portuguese group)</td>
</tr>
<tr>
<td></td>
<td>Sweden: STADNAP</td>
</tr>
<tr>
<td></td>
<td>France (lab de police scientifique): ISFH-PNG</td>
</tr>
<tr>
<td></td>
<td>Poland: Polish society of forensic medicine and criminology</td>
</tr>
<tr>
<td>Paint</td>
<td>Austria (Ministry of Interior), France (Gendarmerie), Spain (Inst. de toxicologia), Sweden, Poland, France (lab de police scientifique): CTS</td>
</tr>
<tr>
<td></td>
<td>France (Gendarmerie), Germany (BKA), Sweden: ENFSI</td>
</tr>
<tr>
<td>Fingerprints</td>
<td>Spain (Inst. de toxicologia), Sweden, Poland, France (lab de police scientifique): CTS</td>
</tr>
<tr>
<td>Toolmarks</td>
<td>Austria (Ministry of Interior), France (Gendarmerie, lab de police scientifique), Germany (BKA), Spain (Inst. de toxicologia), Sweden, Poland: CTS</td>
</tr>
<tr>
<td>Footprints</td>
<td>France (Gendarmerie, lab de police scientifique), Sweden, Latvia: CTS</td>
</tr>
<tr>
<td>Traffic accidents</td>
<td>Netherlands (NFI): joint venture of NFI and the police</td>
</tr>
<tr>
<td>Computer</td>
<td></td>
</tr>
<tr>
<td>Speech</td>
<td></td>
</tr>
<tr>
<td>Gunshot residues</td>
<td>France (Gendarmerie, lab de police scientifique), Germany (BKA), Sweden, Poland: CTS</td>
</tr>
<tr>
<td></td>
<td>Germany (BKA): ENFSI</td>
</tr>
<tr>
<td></td>
<td>Austria (Ministry of Interior): BKA</td>
</tr>
</tbody>
</table>
### Investigation | Institutes
---|---
Firearms | Austria (Ministry of Interior), France (Gendarmerie, lab de police scientifique), Sweden: CTS
Documents | France (Gendarmerie, lab de police scientifique), Spain (Inst. de toxicologia), Sweden, Poland: CTS
Handwriting | France (Gendarmerie, lab de police scientifique), Spain (Inst. de toxicologia), Sweden, Poland: CTS
| Germany (BKA): BKA
Hairs | Germany (BKA): BKA, France (Gendarmerie), Sweden: CTS
Fibres | Austria (Ministry of Interior), France (Gendarmerie, lab de police scientifique), Germany (BKA), Spain (Inst. de toxicologia), Sweden, Poland: CTS
| Germany (BKA), Latvia, Sweden: ENFSI
Environmental | France (Gendarmerie): INERIS
Glass | Austria (Ministry of Interior), France (Gendarmerie, lab de police scientifique), Germany (BKA), Sweden, Poland: CTS
Arson: flammable residues | Austria (Ministry of Interior), France (Gendarmerie, lab de police scientifique), Spain (Inst. de toxicologia), Sweden: CTS
| Austria (Ministry of Interior), Germany (BKA): BKA
Arson: technical causes | Germany (BKA): BKA
Bloodstain patterns | France (Gendarmerie), Sweden: CTS

## 6 Conclusion

A clear growth in quality awareness can be observed in Europe, including in the forensic institutes. Throughout the article we have seen the consequences of this growing awareness. Several trends in quality in European forensic institutes were discussed, such as the growing attention to training requirements for forensic experts. This was connected with the expectation that certification of forensic experts as a measure to guarantee quality, will be used more frequently in the future. Another notable trend that was discussed is the trend towards more and more forensic institutes in Europe being accredited or in the process of being accredited. Attention was also paid to international proficiency testing, which is carried out more frequently nowadays, especially in the form of inter-laboratory testing. In my opinion, these trends could contribute to the international acknowledgement of the forensic institute, as an institute which delivers high-quality, state of the art products and services. In this way, working on quality will contribute greatly to international co-operation between forensic institutes and to the possibilities for harmonisation of forensic expertise.
Chapter IV: Quality

References

Chapter V

Comparative Law
1 Introduction

The very idea of 'harmonisation' of national laws is built upon the existence of differences between the various legal systems. At the same time the concept of 'harmonisation' presumes that greater unity amongst the states can be reached.

In this chapter attention is given to the complexity of the current situation in which there is an enormous variety in legislation, case law, and policies. In his article on the significance of comparative law, Hans Nijboer discusses the contribution that comparative legal studies offer to the understanding of the field. It is emphasised that not only formal legal rules are important; informal, cultural factors may be as important as the classical 'legal' phenomena usually studied by legal scholars. The 'law in action' is often decisive for a proper understanding, therefore sound comparative legal studies should include the various practices, not only of lawyers, but also of other participants in the legal system – including forensic experts. In its turn in-depth comparative study can contribute to the necessary stock-taking before one starts real moves in the direction of 'harmonisation' in the domains of legal and technical norms and standards. Close scrutiny is needed to see where and what the concrete impediments and necessary conditions are.

Apart from this contribution about comparative law and procedure in general, specific attention is given to comparative analyses of the law of evidence in different national systems. Here Jean Pradel's general report on this subject shows how different the various laws are when we concentrate on the 'formal' legal rules. But, seen from the perspective of 'fact finding' as one of the primary functions of the criminal justice systems, this picture is only a part of what is relevant here. As in procedural law in general, more rules are devoted to exceptional situations than to the 'run of the mill' cases, the average situation.

If we focus on the 'general' aspects in 'fact finding' processes there is already much unity in the actual situation, Hans Nijboer contends in the third article in this chapter (on investigation). In his view there are multiple dimensions that can be considered in terms of 'generality': internationally, inter-professionally and inter-disciplinary. From his perspective there is a solid foundation for reaching greater unity in the administration of justice. Finally, Lia van der Westen's contribution to this chapter discusses a number of data from our empirical research on the institutional environment of forensic expertise in different countries. As can be expected, there are major differences between the various countries with regard to
Chapter V: Comparative Law

organisation and regulation of expert evidence, organisation of the police and of forensic expertise.

Johannes F. Nijboer
2 The Significance of Comparative Legal Studies

Johannes F. Nijboer

1 Comparing ‘look-alikes’ rather than ‘identicals’: functional equivalents

Forensic experts fulfil their jobs in different normative settings. If they are experts in well established fields, such as forensic toxicology, they are guided by the conventions of that field. In a sense they are literally ‘disciplined’ by their profession. In the Western world “professional norms” aimed at ensuring sound methods, procedures and standards are usually international, at least in the established fields of expertise. Professionals communicate across borders. They keep up to date on developments in their field through international publications, journals, and websites, among other things. In newer fields of expertise, the normative requirements of the profession may be less articulated (and sometimes quite local).

Forensic experts are also bound by the legal rules of the domestic legal system and, at least formally, by the demands of their clients and the actors in the criminal justice system (police officers, advocates, judges). These actors work primarily in a national setting. The forty-one countries of the Council of Europe represent about the same number of different legal systems. In many areas forensic expertise may be global or international, law is not. This is one of the major difficulties faced in working across borders and/or stimulating international unity, for instance throughout Europe.

One example in the area of forensic psychiatry will suffice to illustrate this point. In The Netherlands, as in Belgium and France, ‘negligence’ is a normative concept. An indictment for a crime of negligence, such as negligently causing someone’s death, can usually be proven without the assistance of a representative of the behavioural sciences. In England and

1. See Ian Freckelton in chapter II in this volume.
2. We should be very careful here: there is actually no such thing as an ‘open market’ in this area.
3. I say “about” because some Member States have more than one system: in the United Kingdom, a Member State; the law of England & Wales is not identical to that of Scotland or Northern Ireland. The same goes for the Kingdom of the Netherlands, where the Netherlands Antilles and Aruba have their own law(s).
Chapter V: Comparative Law

Wales a similar indictment requires the demonstration of a certain state of mind (\textit{mens rea}), a kind of psychological ‘fact’. Such proof is usually offered by the prosecution in the form of statements by forensic psychiatrists.

As this example shows, it is not easy to find identical legal phenomena across borders, even though the wording of a crime definition or another legal concept may be identical or an ‘exact’ translation (according to a dictionary). I maintain that you will find only “look-alikes” and not “clones” (or “exact copies”) when comparing different (national) ‘laws’.

Two more examples can be given to support this view: many crimes are punishable only when committed with intent (\textit{dolus}). In some countries, at least in relation to traffic accidents, \textit{dolus eventualis} (something like conditional intent: when the person does not explicitly intend the (bad) consequences of his behaviour, but basically accepts them by acting in a certain way and hoping that they will not occur) is perceived as a form of intent. In most countries, however, it is perceived only as a form of negligence. This means that the same acts can be punishable as serious crimes in one country while they are not even liable to punishment in another. As a consequence, statistics on the number of certain crimes cannot be compared usefully/adequately. A year or two ago, an American prosecutor explained the (in his opinion) disastrous consequences of the Dutch policy of non-prosecution of certain drug addicts by referring to the high number of crimes against the person in the Netherlands. In fact, the relative number of killings in the country is very low (about 200-250 per year in a population of 16 million). What gives rise to this misunderstanding? The Dutch police and courts classify as ‘attempted murder’ cases in which a motor-vehicle driver involved in an accident does not stop upon police orders to do so (‘hit-and-run’ cases). This affected the outcome of the Fifth United Nations Survey of Crime Trends and Operation of Criminal Justice Systems (1990-1994) to a remarkable degree, resulting in over 2000 (attempted) murders in the Netherlands. This was the number quoted and misinterpreted by the American prosecutor mentioned above. The other example is the concept of “witness”/“témoin” in English and French (the two official languages in which the European Convention on Human Rights and Fundamental Freedoms is laid down). In the legal languages of the English and French speaking countries the meanings of these terms are not entirely identical: a witness in an English speaking country is someone who is able to testify about facts at issue in a case irrespective of

4 A.M. Dingley of the University of Groningen is conducting a comparative study on this subject.

5 Dutch case law even goes further, accepting \textit{dolus eventualis} as a form of intent for almost all crimes.


7 Article 6, 3d, mentions the word witness.
actually doing so (or being summoned to do so in court). His French colleague only obtains the legal status of témoin when actually called and appointed as such by the court or examining magistrate (juge d'instruction). In English-speaking common law systems 'witness' may also refer to an expert witness. As a consequence forensic experts are usually perceived as a kind of witness when called to the courtroom by one of the parties or — exceptionally — by the court. In France an expert is seen as a participant in the proceedings who appears in a personal capacity. He is expected to help the court or the magistrate (and not one of the parties, including the civil party (parti civile) as a neutral and independent (unbiased, impartial) aide.

The confusion about experts brings us back to the difficulties that arise when studying the involvement of forensic experts in different procedural systems. Comparative legal studies have much to contribute, particularly by making caveats. As mentioned earlier: forensic expertise may be international to a certain degree, but in general law is not. The result of comparative studies is to highlight the various normative (legal) settings. It adds to a better understanding - and knowledge - of the different systems, their 'look alikes' and their differences. Consequently, comparative study facilitates international co-operation and 'harmonisation' (or more modestly: compatibilisation) of rules and practices.

Finally, there is one other concept that should be introduced when explaining the aim of comparative work: 'functional equivalents'. When studying different systems, similarities in the operation of the systems under comparison sometimes become clear rather unexpectedly. At the end of the eighties in Germany and Holland a discussion emerged about 'deals with criminals'. Most scholars denied the existence of 'plea bargaining' in those countries (seeing this as a typically American phenomenon). It took a while before we were willing to admit that 'transactions' between the accused and the prosecution, regulated in the Dutch Criminal Code since the twenties, are the Dutch version or 'functional equivalent' of American pre-trial settlements. Transactions have been allowed in the Netherlands since 1983 for crimes not exceeding the maximum imprisonment penalty of six years. Both plea-bargaining and transactions aim to diminish the case load of the system.

2 Levels of the law, in particular procedural law

The main method of comparison between the Criminal Codes of different countries is reading and analysis of the Codes, assuming that one can read the languages in which they have been written and/or that good transla-
Chapter V: Comparative Law

tions are available 9. Secondary sources (commentaries, historical literature) complete the material studied. As a rule, the comparatist can do this work in his/her own workplace without using other methods, such as mailing questionnaires or travelling to the foreign countries involved. Comparing the case law and/or doctrine on a subject in substantive (material) law - e.g. negligent manslaughter - might be slightly more complex (See above). This approach, however, is inadequate for learning about the operation of the legal system, i.e. the procedural side. Reading may be the starting point, but one needs additional information.

Reading the Dutch Code of Criminal Procedure, one can easily get the impression that Dutch criminal procedure is very akin to the German, with respect to the appearance of witnesses and experts in the courtroom. Even the doctrinal concept of ‘immediacy’ (Unmittelbarkeit in German, onmiddellijkheid in Dutch) is quite similar. Nevertheless, witnesses and experts appear in court only in a minority of cases in the Netherlands as a consequence of the case law of the Court of Cassation. The remaining cases are tried on the basis of the case files - totally different from the German practice. 10 The important thing is that the expert does not appear in court. The same applies to witnesses whose earlier statements can be found in reports made by the police or the examining magistrate. This means that in order to obtain a more complete and accurate account of the situation, the case law is as important as the Code.

In my opinion 11 it is very useful to distinguish between different levels in the (procedural) law, all of which should receive attention when conducting a comparative study. These levels 12 are:

1. written law (Code, Acts);
2. the case law of the leading court(s) (Court of Cassation, Review Court, Revision Court, Constitutional Court);
3. soft law in terms of guidelines, standing court practices, etcetera;

10 In both Germany and the Netherlands the expert report is part of the ‘dossier’ or the case file.
12 More levels can be added when appropriate. For instance, one can put the European Treaty on Human Rights and the case law of the Strasbourg court as two levels on top when studying constitutional aspects of the procedure in a European context.
4. daily practice – seen by a reporter, and described in lay rather than legal terms.\[^{13}\]

To take comparative study seriously, adequate knowledge can be obtained only by using methods like questionnaires, interviews, observation (travel is therefore essential) in addition to the examination of written sources. The present book on harmonisation in forensic expertise is the product of a study in which we have tried to avoid the one-sidedness and fallacies arising from studies limited to written materials. For an account of the methods used I refer to the article by Leo Toornvliet\[^{14}\] in this volume.

3 \quad \textbf{Legal practice in the broad sense (law in action) rather than in the narrow sense (jurists’ activities)}

Traditionally, continental jurists, legal scholars, and even legal historians, distinguished between ‘law’ and ‘practice’. Until recently they focused chiefly on the study and development of written law, considering the operation of the law (legal system) as ‘mere practice’. When they felt the need for insight into practice, they enlisted the help of social scientists such as sociologists or criminologists. The importance of ‘practice’ was underestimated, but this has changed. About 25 years ago, long after emergence of the ‘legal realist movement’\[^{15}\] in the common law world,\[^{16}\] themes such as ‘law and society’ and ‘psychology and law’ started to draw the attention of the legal community not only in Academe, but also in circles of practitioners, legislators, and (other) policy makers in continental countries. Although comparative law was a more empirical discipline, it did not become popular and influential until recently.

This being the case, it is not surprising that those who are interested in the development of the law pay more attention to ‘the law in action’ than in earlier days. Practice does matter – this applies not only the work of the legal professionals (and the operation of their institutions), but the work of other professionals within the legal system as well. Here again, forensic expertise comes into focus as a part of the ‘legal reality’. Many cases – criminal, civil and administrative – have elements that require forensic expertise relevant or even decisive for the outcome of the case. A very striking example from the point of view of outcome is provided by a relatively new exercise in comparative law. This exercise brings together jurists from

\[^{13}\] This level has been shown to be extremely important for understanding the Strasbourg case law on human rights: the Court assesses whether in a concrete case human rights were violated, irrespective of the higher layers of the law (that function as mere contexts in the decisions - under the heading ‘relevant domestic law’).

\[^{14}\] Leo Toornvliet in this volume.

\[^{15}\] In America the movement started in the 1920-s.

different systems and asks them to judge the same hypothetical case according to their own system of law. Very often the results are far more similar (e.g. in an outcome such as ‘claim granted’, ‘claim dismissed’ or ‘acquittal’, ‘conviction’) than one would expect on the basis of a comparison of the ‘law in the books’ (say levels 1 and 2 as mentioned above). This again shows that practice matters and that there appear to be more ‘determinants’ of actual operation of a legal system than just ‘the law in the books’.

This all adds to the complexity of the field we are concerned with at present. Efforts to better understand the practices of jurists and forensic experts in different countries in our search for possible ways to contribute to greater unity, or at least to better international cooperation among forensic experts and legal professionals, will inevitably face complexity. The activities of these professions will not necessarily become less complex as a result of harmonisation. Easier access to resources across borders is the greatest anticipated benefit of harmonisation for forensic experts: ‘simplification of procedures’ rather than ‘reduction of complexity’. Harmonisation can do nothing to alter the complexity of criminal cases related to areas of forensic expertise. International ‘transferability’ and transparency of forensic expertise are the features that will change most. Forensic work will continue to be as difficult and exacting as ever. Nevertheless, greater transferability and transparency are both to be welcomed inside and outside the unified Europe of the twenty-first century.

4 Structural and cultural elements

Human beings are oriented towards norms and values. It is not only the formal sets of professional and legal standards and rules that influence human behaviour, including the way they do their jobs. It was not until recently that the ‘cultural’ dimensions of human activity were ‘discovered’ as being important to social, legal, and economic aspects of life including professional work. ‘Culture’ refers here to “our collective mental programme” or, as G. Hofstede, an eminent scholar in organisational culture, puts it: the “software of the mind”. Staying with Hofstede for a moment, it is interesting to see what he discovered about national cultures in relation to professional work in one international corporation (IBM). Some decades ago the company tried to implement the same kinds of labour contracts and labour conditions for its personnel in all the countries in which the corporation was active. It did not work... and IBM wanted to

18 Which is needed in the internationalising reality throughout Europe. See also Hans Bevers/Chantal Joubert, and Julian Schutte in this volume.
19 See G. Hofstede, Allemaal andersdenkenden: omgaan met cultuurverschillen [All dissenters: dealing with cultural differences], Amsterdam: Contact 1991 (reprint 1995).
know why. The basis for Hofstede’s scientific work are his interviews with company employees worldwide. The study produced a wealth of data about implicit values and norms. National cultures differ in social (in)equality: German and French cultures show much more hierarchy and (‘vertical’) distance in power than the Dutch. In addition, the French seem to have a seniority principle as well. Another important factor underlying differences between countries is the acceptance of the pursuit of individual goals and the space left for putting individual values above collective ones. The USA and Japan form an easy contrast on this point. Hofstede lists other dimensions along which remarkable cultural differences abound:

- the relationship between the sexes (including the position of women),
- the willingness to take risks and accept uncertainty in contrast to the avoidance of risk and uncertainty,
- organisational structures (company, family, village/town), both formal and informal,
- the importance of ‘truth’ over ‘virtue’. Here the ‘weight’ of sound fact-finding as opposed to ‘compromise’ about facts - even in terms of ‘settlement’ of facts can be mentioned.20 (Within the area of forensic expertise, this might at least partially explain why in earlier times, in some countries less attention was given to the development of technical and scientific methods and devices of fact-finding (investigation and proof) in the forensic sciences. For example, before 1989 in many of the Eastern European countries.)

Similar comparisons of national cultures can be made between professional cultures and so forth. We will leave Hofstede for the moment. The point I wish to make here is that comparative legal studies, especially if they include the ‘lower’ levels of the law, need to pay attention to the “cultural” dimensions as well as the structural elements of the legal systems. Using the United States as an example, the fact that this country has a jury system operating in the adjudication of criminal and civil cases is a ‘structural’ element; how Americans feel about the jury system (the majority are positive) is a cultural dimension. The interplay between national and professional cultural differences can be shown using the example of a task force working for the European Railway Societies, mentioned earlier. The members together tried to develop a train driver’s cabin, and in par-

---

20 The Parliamentary Inquiry in the Netherlands (in 1998-99) into the crash of an El Al Boeing in Amsterdam (1992) demonstrates again how facts are covered up in this country so as not to cause social unrest. The Inquiry found that many essential data (the nature of the freight, the bad maintenance of the aircraft, the involvement of the Israeli army and secret police, the privileges of El Al at Amsterdam Airport Schiphol) had not been disclosed immediately after the crash or later on by those who knew the facts. Investigations into the crash conducted prior to this Inquiry had been conducted in a half-hearted fashion or stopped on unclear grounds. In a taped conversation about hazardous freight we can hear one of the authorities involved saying, “Dat houden we onder de pet.” (Dutch for “We’ll keep this under our hat.”)
Chapter V: Comparative Law

ticular a dashboard, which would be usable throughout Europe. They accomplished this major task after years of hard work. The approach they were forced to follow was extremely difficult. It appeared that few functional and technical differences existed — for instance, the use of the left hand or the right hand tracks, or the various electric currents in the different countries. Most energy was put into overcoming the enormous variety of cabin designs in the different countries, that seemed to result mainly or exclusively from the diverse non-explicit cultural assumptions about human behaviour.

All who explore the possibilities of harmonisation in forensic expertise (legal rules and regulations as well as methods, standards and devices) and take stock of the existing features will realise how complex this area is: international dimensions are very much mixed up with local (national) dimensions. As I said at the outset "professional norms" can appear to be universal, but upon a closer look they often are not, influenced as they are by national laws and national cultures, organisational culture in a particular laboratory or other institution, legal cultures and professional cultures. Yet, this is what we have to consider if we are serious about the issues addressed in this volume.

The remainder of this paper concerns the role of comparative law as a practice-oriented discipline within legal scholarship. Against the background of the above-mentioned complexities, I will address the main aspects. Further detail does not seem necessary here, because most examples do not concern expert evidence. Only where the case law of the European Court of Human Rights in Strasbourg is concerned, a few cases are interesting (such as Mantovani versus France). These cases are, however, described in other parts of this volume.

5 Legal systems as families

One of the popular insights of comparative legal scholarship is the existence of ‘families’ of legal systems (common law, Continental or civil law, Islamic law, and so forth). The underlying idea is that some legal systems have more in common than others. The reasons or causes can be found in historical circumstances: Israel has a common law system as a result of having been a British protectorate after the First World War, combined

23 See Petra van Kampen and Livia E.M.P. Jakobs/Wim J.J.M. Sprangers in this volume.
with the influx after the Second World War of American legal scholarship. Countries in Central Europe have undergone common changes since 1989 - which sometimes results in striking similarities (the not easily limited role of the prosecution, as the successor of the powerful prokuratura in the Communist era). Sometimes, for various reasons, one country may go a different way from other countries in the region; Croatia recently adopted a German type Criminal Code.

Family traits are more easily recognized at a distance (overall view) than at close range (details). The powers and roles of the examining magistrates in France, Belgium, and the Netherlands differ. For example, the role of the Dutch examining magistrate is much more limited. Nevertheless, seen from a wider distance, they are similar to each other, in contrast with countries where the examining magistrate (who carries out an extensive pre-trial investigation on behalf of the court) does not exist (Germany).

There are at least two interesting things about legal families:

- their 'existence' can be helpful when selecting countries for comparison (for comparative studies like this one).
- it makes is easier to predict decisions of the Strasbourg Court. Knowledge of the case law in the examination of witnesses in cases against the Netherlands makes it possible to predict where France or Belgium can or will run into difficulties, as well as to predict the consequences of legal measures at the international level (directives from Brussels, recommendations, resolutions, and conventions from Strasbourg). I will come back to this in relation to the case law from Strasbourg.26

6 The dynamics of the law

Non-jurists tend to see the law as a static set of rules. Economists take the law as an external datum (in their ceteris paribus approach). Psychologists sometimes criticise the unrealistic meaning of legal rules (concerning eyewitness testimony or the presumption of innocence). The difficulty here is that for them it is very difficult to perceive the law as something that can change. Nevertheless, the law does change, albeit slowly, over time. In this sense it is dynamic. This changing character of the law causes pitfalls when using older comparative studies because the law could very well have changed in the meantime.

On the other hand, today many changes in national laws in Europe (as well as in other Western countries) may be a result of comparative arguments. Particularly in procedural law one sees reform projects that are inspired by foreign examples, often with a view to the implementation of

26 A clear example is the case of Mantovanelli vs France (ECHR 23 April 1997, NJ 1998, 278).
Chapter V: Comparative Law

Recommendations of the Council of Europe or the case law of the European Court of Human Rights. 27

7  The setback of the nineteenth century: the primacy of national law

From the perspective of increasing comparative orientation of legislators and courts, it is interesting to follow the swing of the pendulum over the last 150 years. Looking back, things are often explainable: in Europe at present the sovereign national state is disappearing and nationalism is waning compared with a few decades ago... There have also been times when they were on the increase: throughout the nineteenth and the first part of the twentieth centuries. At the beginning of the nineteenth century most Continental countries found a basis in ‘academic’ law and the influence of Napoleonic codification was widespread.

On the European Continent the ‘classic’ basis of academic law was the Roman law, as it had been elaborated down the centuries. The emphasis was on private law; nevertheless the situation in substantive criminal law (perhaps to a lesser degree in procedural law) was pretty much the same. Dissertations and other academic books were still written in Latin, enabling scholars to communicate across borders. At the same time national legislators became highly productive in developing national codes, modelled predominantly on the Napoleonic codes. In the codification process comparative arguments were commonly used. However, once countries had codifications in their own languages, scholars and practitioners shifted their focus toward the basis of the national law. Academic activity followed. Halfway through the nineteenth century Latin was replaced by the national languages. The national law orientation continued until long after the Second World War. Comparative law, like legal history, became a kind of luxury, a discipline outside the core business of national law. Elsewhere I have labelled this inward looking attitude ‘introverted’. 28 With slight exaggeration we can depict the situation as follows: national jurists, courts, and other institutions belonged to an isolated world of language and culture. International activities, like the membership communication within the International Criminal Association (IKV and later AIDP) 29 were only marginal phenomena next to the mainstream activities of the legal professions. International co-operation (mainly extradition) was rare by compari-

27 An inventory with regard to Belgium, France, Germany, The Netherlands, and the UK will be included in Jr. Nijboer, De taken van de strafrechter [The Tasks of the Criminal Court Judge] (forthcoming Deventer: Gouda Quinn).


son. This explains the long lasting social mildness of criminal law in the Netherlands which came to an end only a decade ago as a consequence of the internationalisation of crime and criminal law.

Even today, the heart of criminal law and criminal procedure in terms of legislation and adjudication is national. In the sphere of international cooperation, as a rule we find statutory ‘national’ international law as a supplement to treaties. Nevertheless, major changes are in the air.

8 The emerging international dimensions of ordinary criminal law

Indirectly many national crimes are defined according to EU directives or treaties. Fishery legislation is a good example of national legal provisions that are replete with community law. The EU is on its way towards Union-wide criminal law in the area of corruption and crimes against the budget of the EU as well as crimes that undermine the single free market. There have also been important impulses towards uniform law (as a consequence of treaties and/or resolutions and recommendations of the Council of Europe). Overall, the body of treaty-based law has grown enormously during the last decades. For a description of the instruments used by the supranational bodies within Europe, see the papers by Bevers/Joubert and Holthuis in this volume. The only point I wish to mention here is that comparative law has become a very important part of research on law in practice: the effectiveness of international instruments depends significantly on the degree to which the legislation of Member States implements or follows international impulses.

Comparative law is back in the spotlight in national law reform, after having spent more than a century off stage. As R. Ottenhof wrote recently, constitutional and comparative arguments have taken the place of classical legalistic and dogmatic arguments in legislation, but also in court decisions and legal scholarship. In this connection, we must mention a second source of change, especially in criminal procedure: the international courts and related institutions. In Europe the case law of the Strasbourg Court has gained authoritative stature. With its carefully constructed decisions,

30 Alongside the national orientation there was a kind of a natural influence of French procedural tradition, especially in relation to the ‘magistrature’ and ‘ cassation’, and particularly in twentieth century German dogma.
Chapter V: Comparative Law

that refer to each other, it exercises influence far beyond the states involved in the cases it hears.

Reading this Court’s decisions, it is clear that comparative knowledge of legal sources and practices form the basis for the Court’s work. In this light, comparative law is important to help understand and predict the Court’s decisions. The Court’s disapproval is most likely where a country finds itself most out of tune with the Court’s jurisprudence, at least where minimal guarantees in relation to the protection of human rights are concerned. Countries can assess the relevance of the Court’s decisions ‘against’ other countries for their own law. Where countries share a great deal, like Belgium, France, and the Netherlands in criminal procedure, it is easy to see how decisions will affect all three systems. Very often these predictions and assessments are made on the basis of a comparative diagnosis. Overall, it can be argued that comparative law has become a necessary tool for practising jurists and legal scholars in this era of internationalisation.

References


Cherif Bassiouni, M., L’association internationale de droit pénal [International Association of Criminal Law], Ramonville St. Agne: ERES 1999.


Hofstede, G., Allemaal andersdenkenden: omgaan met cultuurverschillen [All dissenters: dealing with cultural differences], Amsterdam: Contact 1991 (reprint 1995).


