DNA PROFILING: WHAT CAN SOUTH AFRICA GAIN FROM THE BRITISH EXPERIENCE?

INTRODUCTION

The discussion of DNA evidence forms part of an ongoing debate between law and forensic science. When discussing the DNA profiling technique one has to consider the use of novel scientific techniques as well as the presentation of forensic evidence to the courts (Sufian 1991:7). This discussion highlights the fact that forensic science makes an important and ever-increasing contribution to the investigation of crime and successful prosecution of offenders. However, certain British miscarriage of justice cases clearly illustrate the grave consequences of an over-reliance on apparently powerful scientific evidence (Roberts 1994:469).

In recent years the British criminal justice system has come under scrutiny and it has often been argued that the system is in a state of crisis (McConville and Bridges 1994:xv-xviii), which led to the appointment of the Royal Commission on Criminal Justice (1993) (RCCJ). The RCCJ considered the role and implications of forensic evidence as well as the role of the police in criminal investigations. Research conducted by the sub-committees of the RCCJ confirmed that in most cases the prosecution and the police are at a distinct advantage when dealing with scientific evidence such as DNA profiling and furthermore that the defence lawyers usually consider the DNA profiling evidence to be so overwhelming that they frequently fail to challenge its validity (Steventon 1993:37-44).

When dealing with scientific concepts such as DNA its relationship with law tends to provide an excellent illustration of prevailing tensions. On the one hand, the potency of forensic science is underlined by the fantastic odds against misidentification, such as that the probability of positive identification has been calculated to be some 30 billion to one that two unrelated individuals will have the same genetic fingerprint (Geberth 1990:264), with which expert witnesses are able to impress the court. On the other hand, the increasing concern provoked by the utilization of DNA technology also highlights the vulnerability of lawyers and lay triers of fact when faced with evidence which they may not be competent to evaluate (Roberts 1994:469-470).

TECHNICAL DIFFICULTIES RELATED TO DNA "FINGERPRINTING"

DNA fingerprinting is a misnomer, since it equates DNA with fingerprints and their reliability. This is not true since with DNA profiling, an emerging "reading" or pattern of genetic material has to be explained and interpreted and eventually accepted as being the truth, whereas with the fingerprint the various lines and swirls can be matched and compared quite easily. DNA fingerprints are not as easy to interpret as an ordinary fingerprint and therefore it is obvious that there will be some problems with the interpretation of results. Hall (1990) states that, although DNA profiling is often presented as a simple visual comparison, in reality the accuracy depends on extremely precise measurement of the distance DNA fragments have travelled in the gel. Most minute discrepancies between the DNA profile bands are not necessarily visible to the eye, and may wholly undermine identification. Robertson et al...
(1990) state that DNA profiling is a technique which enables the scientist to compare two biological samples and to determine the likelihood that these samples originated from the same person.

This statistical probability calculation is the final step in the DNA process and when a match is realised, the uniqueness of the band pattern is then statistically calculated for a specified population. This is conducted by comparing the matched bands against a data base of bands, previously obtained by using the same probe in the same racial population. If more than one probe is used, a comparison is made for the band pattern produced by each probe.

The final statistic is then expressed in terms of the probability that this match would occur by chance in this population group (Burk 1994:1074). To provide some indication of the rarity of the DNA profile involved, one has to consider the frequency of occurrence of the various DNA markers within populations. All the major ethnic populations have to be included as some markers can be common in one ethnic group but rare in another. Once the population data has been obtained, it is necessary to compute an overall frequency to provide a statistical probability of the rarity of the profile (Martin 1995:6). The type of profiling system used by the respective laboratories furthermore has to be fully studied, since the system will usually influence the "scientific, technical, and interpretative aspects of DNA data evaluation" (Robertson et al 1990:139).

Initially most of the cases in which DNA evidence was used by the prosecution went ahead without any challenge. But this period was soon over for the prosecution, and the smooth sailing of the evidence began to be attacked in two parts of the globe, i.e. in Australia and in the United States of America (Burk 1990:53). Hence, DNA profiling is being attacked in some quarters as an "unreliable and unproven scientific technique that turns courtrooms into laboratories, and defendants into guinea pigs" (Hoeffel 1990:467).

PROCEDURAL DISCREPANCIES RELATED TO DNA EVIDENCE

Scientists engaged by the prosecution are always in danger of becoming part of the team attempting to assemble incriminating evidence (Roberts 1994: 480). They are often accused of giving inadequate consideration to the concerns of the defence. Stockdale (1991: 772) reflects this clearly when he states that "forensic scientists who run with the hounds cannot be expected to give a savaged fox a kiss of life". It is the author's submission that in the present adversarial trial system, experts are likely to be coerced into taking a one-sided approach. Courts should, therefore, not convict merely on DNA evidence alone since science is often considered to be infallible by lay persons who could easily be influenced.

In the words of Mansfield and Wardle (1994:236):

"Science can so easily be seen as the provider of unarguable truths but today's truths often become tomorrow's miscarriages. And we don't seem to learn. The current scientific holy grail is DNA and as much caution needs to be exercised over this as over other fallible tests. For this reason amongst others, there should be no prosecution on forensic evidence without corroboration from another source. Just as with confessions, there must be a second source of evidence".

A question posed is whether the courts are ready to deal with complex matters of science, such as DNA profiling. When scientific evidence is presented to the courts, the burden to disprove it lies on the defence who are very often not given a "fair deal" within the scientific evidence arena due to a lack of legal aid funding, lack of time, insufficient sample material, degenerated sample material, etc.

Some definite pitfalls with DNA profiling as an
identification medium are listed below (see Eastal et al. 1990, Lavranos 1994, National Research Council 1992 and Hall 1990: 484):

(a) Error in sample treatment or data analysis - this could occur from switching, mixing, cross-contamination of samples in the laboratory;

(b) interpretation of DNA patterns;

(c) lack of uniformity in the criteria used to determine whether the two patterns match, and

(d) the lack of population studies on which the predicted likelihood of a mismatch is based.

THE RELATIONSHIP BETWEEN SCIENCE AND LAW WITH REFERENCE TO FORENSIC MEDICINE

The main assistance that science provides to law is in the form of forensic evidence. Oddie (1991) states that it would be difficult to imagine a legal system without forensic evidence in criminal cases. Forensic evidence means nothing more than the science which is used in the courts, i.e. the science behind expert evidence. Walls (1971: 1) adds that the most important function of scientific evidence is to convert suspicion into a reasonable certainty of either guilt or innocence. The forensic expert is allowed to express an opinion. Opinion evidence is admissible if it is relevant. Generally an opinion will be relevant if the witness is better qualified to form the opinion than the court. The role of the expert witness is not to replace the function of the court, but the expert's testimony could place the court in a better position to debate and decide on the facts. It must be pointed out that because experts refer to 'opinion' and not 'fact' there is a likelihood of disagreement (Smith 1989:64-65).

Witnesses are generally only allowed to testify as to the actual facts perceived by them. The court (or jury) has the power to draw inferences and/or to speculate as to their causes. However, an exception arises when dealing with the expert. Experts have to remain objective and they should give genuine opinions and it is not the expert's task of acting as a hired gun for the party that has called them. The functions of expert witness testimony was clearly put by the then Lord President Cooper, in the case of Davie v Edinburgh Magistrates (1953) S C 34 at 40 when he stated that "their duty is to furnish the judge with the necessary scientific criteria for testing the accuracy of their conclusions, so as to enable the judge or jury to form their own independent judgement by the application of these criteria to the facts proved in evidence". In the case of R v Maguire 1992 (2) ALLER 433, the court held that failure on the part of the expert (forensic scientist) to disclose factors that might be seen to be significant to the defence case, could lead to a "material irregularity at the trial", even if the Crown prosecution were not aware thereof, and that this would lead to the conviction being set aside.

In England two agencies are responsible for forensic science preparation, they are the Metropolitan Police Forensic Science Laboratory (MPFSL) and the Forensic Science Services (FSS). However, it must be stressed that both these services are organised in a way that seems to favour the prosecution and the police. Limited access to resources and scientific expertise make it difficult for the defence to challenge the prosecution evidence (Jones 1994:12-20). Creaton (1994) referring to Jones (1994) says that the legal system has manipulated the form and content of scientific evidence to serve its own objectives. The adversarial process encourages partisanship, yet the courts tend to denounce those experts who reveal their subjectivity. The British study of Roberts and Willmore (1993) highlighted the fact that "forensic science" is neither objective nor as contestable as its popular reputation might suggest.

The legal and scientific dogma that the "facts speak for themselves" or res ipso loquitur is supposed to be
adhered to but in practice no one in the legal process leaves what they say to chance. In the words of Jones (1994: 5) "Legal and scientific facts are not given; they are highly pre-fabricated". Another problem with the-facts-speak-for-themselves issue is that the very existence of an expert witness who gives opinion evidence, clearly shows that the facts do not always speak for themselves but clarification is required. With DNA evidence expert testimony is always going to be required.

The main problem of scientific evidence being used in the criminal justice process is the fact that the prosecution in its use of forensic scientists is not as impartial as one is led to believe, and there is evidence that points to the fact that the Home Office is very selective in the scientific evidence it presents (Mansfield and Wardle 1994:168). Sanders and Young (1994: 264) identify the problem that scientific evidence is very susceptible to the process of case construction. They add that forensic examination does not take place in a vacuum, and all depends on various tests and possibilities as well as different interpretations. It has to be stressed that since the scientists are concerned with the truth, in fact scientific truth, so it is only correct to expect them to fully disclose their findings.

The unequal treatment of the prosecution and the defence has to be seen in the light of the revelations in cases such as the Guildford Four, the Birmingham Six (1991), Maguire (1992), Ward (1993). In these cases the actions of the police and their scientists were responsible for misleading the courts with respect to the reliability of the results obtained from the forensic samples (Sanders and Young 1994:264-265).

When the Guildford Four were released in 1989, Sir John May was asked to look into the Maguire case and from his inquiry he found out that there were problems with the scientific evidence that was used. This led to the quashing of the Maguire convictions and it further led to the scientific evidence in the Birmingham Six case being scientifically reviewed (Sanders and Young 1994:450). The Court of Appeal recognised in the cases of the Birmingham Six and that of Judith Ward that with the accusatorial trial and its adversary nature, parties are often not matched in resources (Jackson 1993:131). The House of Lords Select Committee on Science and Technology (1993), looked at the following miscarriages of justice cases which are relevant to a discussion on DNA profiling since these cases highlight the fact that the convictions were based on expert scientific testimony:

(a) The Tottenham Three - the ESDA evidence showed that the police notes of the interview had clearly been tampered with.

(b) The case of Judith Ward - new scientific evidence rendered the convictions "unsafe and unsatisfactory" and the failure by the prosecution and the scientists to make this available to the defence and the court was totally irregular.

(c) The case of Stefan Kiskio - the accused was convicted of murder in 1976. In 1992 he was cleared by the Court of Appeal, since the medical evidence revealed that the semen stains on the victim's clothing could not have come from the defendant who was sterile. It transpired that this fact was known to the police before the original trial, but it was not disclosed to the defence and possibly not even to the prosecutor.

(d) The case of The Maguire Seven - here Sir John May said that "the whole scientific basis upon which the prosecution was founded was in truth so vitiated that on that basis alone the Court of Appeal should be invited to set aside the conviction."

(e) The Birmingham Six Case (referred to above) - the ESDA was used positively in this case, the test for nitro-glycerine proved to be
inaccurate as it could have been contaminated from other source. The conclusion in this judgment highlights the main problems of dealing with a new novel concept of scientific evidence in our situation (DNA profiling). The court stated that:

“If we put the scientific evidence on one side, the fresh investigation carried out by the Devon and Cornwall Constabulary renders the police evidence at the trial so unreliable that we would say the convictions are both unsafe and unsatisfactory. (emphasis added)” (Rosenberg 1994:313).

CONCLUSION

Some obvious problems exist with regard to the utilisation of forensic science evidence, e.g., there is genuine scientific disagreement at times, a definite possibility of samples becoming contaminated, serious financial constraints for the defence while courts will have to adopt a more cautious approach with regard to scientific evidence. The above-mentioned cases reiterate the necessity to adopt a more critical approach with regard to the claims of scientific experts (Redmayne 1995:482).

The author concludes that DNA profile evidence has both the potential to eliminate innocent suspects as well as to identify the guilty offender. However, it should be emphasised that DNA is not infallible and depending on the circumstances of the particular case, the evidence may be challenged with a certain amount of success.

BIBLIOGRAPHY


