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DNA EVIDENCE IN CRIMINAL INVESTIGATIONS THE NEW ZEALAND EXPERIENCE

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CONTENTS

ABSTRACT

This paper looks at the New Zealand experience of DNA profiling as evidence in criminal investigations. A brief description is first given of the process of DNA profiling, as well as techniques and laboratory procedures which are used. Next follows a discussion of the problems inherent in interpeting DNA profiles and the issue of admissibility. The developments in the UK, USA and Australia are described, followed by those in New Zealand, where the issue of informed consent has until very recently been especially relevant. The paper then looks at the way in which DNA evidence has been challenged and the difficulties faced by defence counsel. Lastly the Criminal Investigations (Blood Samples) Act 1995, which has just come into force, is discussed. Particular attention is devoted to the arguments for and against the provisions for compulsion orders and the use of force. New Zealand has followed developments overseas with regard to DNA technology, but has taken the lead over countries such as the UK and Australia with regard to legislation to facilatate DNA profiling in criminal investigations. The conclusion is reached that the various benefits of this revolutionary new forensic tool should not cause one to adopt an uncritical approach to scientific evidence of this nature.

The text of this paper (excluding contents page, footnotes, and bibliography) comprises approximately 15,600 words.

I INTRODUCTION

The techniques of DNA profiling have been hailed as "the most potentially far-reaching scientific advance to offer assistance to the criminal justice system since the development of fingerprint analysis."[1] This method of identifying an individual by analysis of their genetic material was discovered in the mid 1980s by Professor Alec Jeffreys under the rubric of DNA fingerprinting and made its first appearance in court proceedings in Britain in 1987. Since then DNA test results have been admitted in evidence in many criminal trials, particularly in Britain and the USA.

In New Zealand DNA investigative techniques were introduced to criminal casework by the Department of Scientific and Industrial Research (DSIR) in 1989, and the first case in which evidence of DNA profiling was led was *R v Pengelly*[2]. In 1992 the New Zealand Law Society promoted a travelling seminar[3] presented jointly by the prosecution counsel and the prosecution forensic expert witness from the *Pengelly* case. Both presenters, Lowell Goddard QC and Dr Margaret Lawton extolled the positive discriminatory powers of DNA profiling and its potential use as a forensic tool.[4] In 1995 the Criminal Investigations (Blood Samples) Act was enacted, and it was the South Auckland Rape inquiry which gave Parliament the incentive to get this legislation through. This Act, which came into force on 12 August 1996, provides for compulsion orders to empower the police to take blood samples for the purposes of DNA testing, as well as the establishment of a DNA profile databank.

In spite of the judicial acceptance of and general enthusiasm about

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1 I Freckelton "DNA Profiling: Forensic Science under the Microscope" (1990) Criminal Law Journal 23.

2 [1992] 1 NZLR 545.

3 L Goddard and M Lawton *DNA Evidence* (New Zealand Law Society, July-August 1992).

4 CA Price *DNA Evidence: How Reliable Is It?* (Legal Research Foundation, Auckland, 1994) 1.

DNA profiling in New Zealand, there has been intense scrutiny in other countries, especially in the USA, of problematical aspects such as the legal and scientific approaches to the courtroom presentation, control standards in laboratory procedures, the proficiency of those involved in the laboratory procedures and as expert witnesses, the techniques of declaring a DNA match, and the problems associated with statistical calculations. In New Zealand, the problems inherent in challenging DNA evidence, as illustrated in *R v Pengelly*[5] and *R v Dougherty*[6], show that the inevitable increase in DNA evidence in criminal trials as a result of the new Act has the potential of leading to miscarriages of justice.

Part II of this paper briefly describes the concept of DNA, the various techniques of DNA profiling and the procedures that are followed by the laboratories and technicians in New Zealand. Part III looks at the interpretation of DNA evidence. Part IV examines the first cases in the UK, USA, Australia and New Zealand and focuses on the issues of admissibility and informed consent. Part V examines the problems inherent in challenging DNA evidence. Part VI deals with the Criminal Investigations (Blood Samples) Act 1995 and the controversial provisions regarding compulsion orders, the reasonable use of force, and the establishment of a DNA profile databank. Part VII concludes the discussion.

II DNA PROFILING

A The Discovery

In 1985 an epoch-making discovery by an English scientist, Prof Alec Jeffreys, made it possible to say that a particular bodily sample did or did not originate with a particular individual.[7] Prof Jeffreys,

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5 Above n 2.

6 Unreported, Court of Appeal, 19 August 1996, CA 23/96.

7 M Gelowitz "DNA Fingerprinting: What's Bred in the Blood" (1988) Criminal Reports 122.

a geneticist at the Unversity of Leicester in England, discovered that forensic science could use restriction fragment length polymorphion analysis ("RFLP"s) to identify the individual origin of biological evidence such a blood or semen based on their distinctive RFLP patterns. In collaboration with workers in the English Home Office forensic laboratory system DNA analysis was applied to forensic problems. Thus was established the forensic tool of DNA identification.[8]

People commonly use the terms DNA fingerprinting and DNA profiling interchangeably, but there are in fact separate approaches to identification. DNA fingerprinting is the term generally applied only to the method first developed by Alec Jeffreys in 1985. This procedure looks at many small regions (one region is referred to as a locus), and is alternatively called multi-locus analysis. This technique is used in paternity and immigration cases by Cellmark, a British company which specialises in DNA testing and has adapted the Jeffreys technique commercially. Most forensic work, however, involves single-locus analysis, because results can be better controlled and interpreted, especially in instances of sample degradation.[9]

B What is DNA?

Everyone's DNA, with the exception of identical twins, has unique variations that can be used to establish identity. DNA is the substance deoxyribonucleic acid which is contained in almost every tissue and fluid in a person's body. DNA profiling is a method that utilises deoxyribonucleic acid (DNA) to identify the derivation of trace biological evidence such as blood, semen, saliva, urine, hair (with root shaft attached) or skin. Therefore, forensic DNA profiling evidence has been used in criminal cases for such purposes as identifying the remains of a victim, linking a suspect to a crime,

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8 ED Shapiro and ML Weinberg "DNA Databanking: The Dangerous Erosion of Privacy" (1990) Cleveland State Law Review 457-458. See also above n 1, 23.

9 A Weiss "Easier to Exclude than to Identify" (1990) Australian Law News 20.

and exculpating a falsely accused suspect.[10]

Human cells contain within them all of the information needed to produce a complete human body. This human blueprint is carried in discreet packets of information known as chromosomes, and the material of which they are made is called DNA. There are 46 such packets within a cell and they can be arranged by means of common characteristics (such as their appearance under the microscope) into 23 pairs. At fertilisation the ovum and sperm, each which contain 23 single packets combine to produce the total of 46. Thus 50 per cent of the genetic information is of maternal origin, and 50 per cent is of paternal origin. This information is contained within its own chemical structure. DNA is made up of two intertwined strands of alternating phosphate and sugar units. The strands are linked by paired chemical complexes called bases, giving an overall effect rather like a twisted ladder. There are only four kinds of bases, known by their initial letters, A, G, C, T. These link up in base-pairs, which correspond to the steps of a ladder across the molecule. The structure of DNA itself can also be envisaged as resembling a zip fastener where A, G, C and T are the teeth of the fastener. Zips have two strands and so too has DNA, but unlike a zip, DNA will only close when A pairs with T, and G with C. The sequence in which these bases occur provides the information required to assemble and regulate the construction of the body, and is unique for every person and creates their genetic code. *Allele* is the genetic term which refers to the variations that occur in a region of DNA.

C The Process of DNA Profiling

The process of examining DNA samples is time-consuming, demanding and expensive, which explains why it is usually available as evidence only in serious criminal cases. The steps in the process of examining a sample are, in simplified form, the following:[11]

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10 See above Shapiro and Weinberg n 8, 457-458.

11 B Robertson and GA Vignaux *Interpreting Evidence. Evaluating Forensic Science in the Courtroom* (John Wiley & Sons (UK) 1995) 161-162; see also n 3, 7-8; see also M Krawczak and J Schmidtke *DNA Fingerprinting* (Bios Scientific Publishers. London,

1 Obtain sample

The first step is to obtain a sample. In a criminal case it will be whatever can be found at the scene of the crime in whatever quantity and condition it can be obtained. The substances most commonly tested will be blood, semen, including spermatozoa, skin, saliva and hair follicles. Results can be obtained from samples as small as 0.01 ml of blood. Samples for criminal cases are generally taken using a medical examination kit so that the documentation and sample integrity is covered. Blood is collected into bottles containing an anti-coagulent. Criminal cases will have non-reference samples relating to the crime in question. They may be swabs of clothing from a sexual assault, bloodstains absorbed onto Cellotape or cotton cloth, hair or numerous other samples.

1 Extraction

The sample is treated to extract the DNA molecules from protein and other cellular material in the sample and to purify it. DNA must be pure to give a good profile.

3 Restriction

In the older systems the DNA was treated with a *restriction enzyme* or *restriction endonuclease*. This cut the DNA into fragments at points at which a particular sequence of bases is recognised. If the DNA is not properly purified then cutting may be limited.

4 Amplification

Selected parts of the DNA can be made to replicate themselves. When this is done restriction is not carried out as the amplification process selects the desired parts of the DNA and ignores the remainder. Amplification is carried out by a cycle of heating and cooling in a primer solution which causes a chain reaction by means of short tandem repeat (STR) technology.

5 Electrophoresis

The fragments are placed in a gel and an electric current is run through it. The negative electrode is placed at the end of the gel where the DNA has been placed and the positive electrode is placed at the opposite end. This causes the fragments to migrate from the gel towards the positive electrode. The lighter fragments move faster

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and whenever the process is stopped the fragments will be sorted by length. Electrophoresis takes up to two days. Samples of DNA from different sources are run through the gel in lanes next to each other. One of the lanes is usually a control lane - a sample of DNA from a known, unrelated source, such as a member of the laboratory staff. Care is taken not to have the crime stain sample next to the sample from the suspect.

6 Southern blotting

The DNA is then transferred from the gel to a nylon membrane by a process known as *Southern blotting*[12]. The fragments become fixed to the membrane, which is easier to work with than the gel, in a way similar to the movement of ink onto blotting paper.

7 Application of a probe

A chemical probe is then applied. This is a piece of DNA of specific make-up which will identify and bind to particular sequences of bases. These probes used to be made radioactive so that their positions could be traced on an autoradiograph. Today, a luminescent chemical is more commonly used.

8 Autoradiography

In the past, an autoradiograph (also called an "autorad") was then developed by placing the membrane against an x-ray film and allowing a trace to develop. This took about 5 days. Today, luminescent chemicals allow the trace to be photographed immediately. The trace roughly resembles a supermarket barcode and the number of bands depend on the particular techniques used. This is how an individual's unique DNA profile is recorded.

9 Measurement

The trace is examined and the position of the bands in the various lanes are measured accurately. Originally measurement was done with a ruler, but increasingly, computer devices are available. The positions of the bands correspond to the molecular weight of the components of the DNA marked by the probes. Some of the bands - those corresponding to the size-markers if they were used - are of exactly known weight. The process is now a matter of comparison of the trace

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12 Named after its inventor, Professor Ed Southern. See KF Kelly, JJ Rankin and RC Wink "Method and Application of DNA Fingerprinting: A Guide for the Non-Scientist" (1987) Crim L R 105.

sample with the control samples, the bloodstain with the blood of the accused, for example. In some cases, the bands will not match and there is an exclusion. This is overwhelming evidence that the two samples are not of the same blood. Where the bands seem to correspond in weight, more accurate measurements are needed and the difference in position between corresponding bases is measured. The measurement of bands is not a straightforward exercise. Band shifting can occur because of numerous factors including variable concentrations of DNA in the slots, variable temperatures or incorrect voltage at the electrophoreses step. For this reason, bands known to be from two samples from the same source may not necessarily be located at the same position on the autorad. When analysts declare that two bands "match" it means that they are so similiar in size that they cannot be distinguished under the procedure being used.[13]

D DNA Technology

Techniques used in DNA analysis, in the words of Robertson and Vignaux,[14] "become obsolete faster than appeals move through the legal system". The various systems that have been used and are being used follow below in chronological order.[15]

1 Multilocus probes

A multi-locus probe is the original type of probe developed by Professor Alex Jeffreys.[16] This is a probe which binds to several similar sequences of DNA and produces profiles composed of bands in a barcode pattern. There will be a number of bands and a dark blur at the end where the lightest bands congregate. Multi-locus probes give very high likelihood ratios but require a large amount of DNA to produce results. For a variety of reasons multi-locus probes are seen as likely to increase the risk of incorrect interpretation and

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13 Above n 4, 7.

14 Above n 11, 163.

15 Above n 11, 163-164.

16 Above n 4, 9.

are not used for criminal investigations.[17]

2 Single-locus probes

A single-locus probe binds to only one particular sequence of DNA bases. It will produce a profile containing two bands only, unless the individual is a homozygote, ie someone who has inherited the same band from both parents, in which case only one band will be revealed. Single-locus probes are more sensitive than multi-locus probes and therefore require far smaller quantities of DNA to produce a result. Because it is more sensitive the technician is also able to distinguish the elements in a mixed body fluid sample more easily.[18] The disadvantage is that they produce relatively low discrimination, with results commonly being able to distinguish only one in hundreds. If there is enough DNA, this can be overcome by using a series of about 3 to 4 separate probes on the same sample and combining the results. The DNA techniques involving the use of probes to take "readings" from sections of the sample, as decribed above, are known as Restriction Fragment Length Polymorphism (RFLP).

3 PCR or Polymerase chain reaction

This is another term for amplification. The earliest PCR systems produced results on dot-blot tests, but single- and multi-locus probes could also be used on PCR product, in which case the system was called AMP-FLP. The advantage of PCR is that amplification is possible from degraded and minuscule samples of DNA. This allows extraction of genetic information from samples that contain severe DNA strand breakage, or too little cellular material for any other genetic typing system. PCR is relatively simple to perform and the results can usually be obtained within 24 hours, compared to days or weeks under the Southern blotting system.[19]

4 Dot-Blot tests

These are test kits which produce very rapid results. The test kit has a pattern of windows which either change colour or do not, indicating the presence of certain alleles. The discriminating power of each of these tests is low, but several combined can produce high

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17 Above n 4, 10.

18 Above n 4, 10.

19 Above n 4, 11.

likelihood ratios.

5 HLA DQA.1

The genetic marker most commonly used in PCR/dot-blot processes examines a specific region of one chromosome containing DNA for a chemical structure (a protein) called human leucocyte antigen HLA DQ. Scientists have identified six different forms of this chemical structure. These different chemical structures are called alleles. The six alleles are known as 1.1, 1.2, 1.3, 2,3, and 4, and each person has two of these alleles.[20] Each individual has two, determined by each of their pairs of chromosomes - a total of 21 possible pairs. Once this specific region is amplified it is used to seek out control DNA on strips and if the individual has this specific protein then it will be indicated by a blue dye. This technique gives a signal by the appearance of a coloured dot if the allele is present and no signal if the allele is absent. The discriminating power of this system is low in comparison with multi- and single-locus profiling.

6 Mitochondrial DNA

In addition to DNA in the cell nuclei every mammalian cell has many mitochondria and each mitochondrion has its own copy of a different sort of DNA. Potentially this can be analysed even in minute degraded samples where the yield of DNA from the nucleus is too small for conventional typing. Analysis of mitochondrial DNA has been successful on single shafts of hair and skeletons up to 3,000 years old. An example of its use was the recent identification of skeletal remains of the Russian Czar and his family.

7 STRs

Short tandem repeat (STR) loci are places where three to five base-pairs are repeated several times and the number of repeats may be different for different people.

E DNA Techniques in New Zealand

DNA testing was introduced to criminal casework in New Zealand in

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20 See also "Tests cast doubt on conviction" Sunday Star-Times, March 31 1996, A4.

1989, by the DSIR,[21] and such testing continues to be done for the police, together with other forensic investigation work. A lengthy, systematic development plan was first carried out over a period of three years before DNA results were reported. The plan established and validated procedures, involved staff training and implemented a quality control program.[22] The DSIR has, however, now changed its name to the Institute of Environmental Science and Research (ESR).[23]

Until recently the single-locus probe technique has mainly been used to analyse samples for forensic purposes in New Zealand. This is a RFLP method which involves the use of probes to take "readings" from sections of the sample. Readings from different samples can then be compared.[24] Generally four to five single-locus probes are carried out and the combination of those results make up the "DNA profile".[25]

The other method of analysis which is beginning to be used by the ESR, and which will be used for the databank, is the polymerase chain reaction (PCR).[26] This amplifies specific gene segments that also vary, but to a lesser degree than RFLPs. The main advantage of the PCR system is that it can been carried out with very small amounts of body samples. The ESR advised the Department of Justice that although each individual PCR test is less discriminating than the single-locus probe, a high degree of discrimination can be achieved using this method by repeating the tests a number of times targeting various sections of the DNA molecule.[27] Another advantage of the PCR

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21 New Zealand Police *Submission to the Justice and Law Reform Select Committee* 12 April 1995, 1.

22 Above n 3, 3.

23 A Crown research institute since 1992.

24 See above Part II D.

25 Department of Justice, *Report to the Justice and Law Reform Select Committee*, 1 June 1995, 3.

26 See above Part II D.

27 Above n 25, 3.

method is that it is cheaper than the single-locus probe.[28]

For a short while the ESR used HLA DQA.1[29] tests, but because they were found to be too expensive and not discriminating enough, they were recently discontinued in favour of other PCR techniques.[30]

F Current Police/Laboratory Procedures

Most blood samples taken for the purpose of DNA testing in relation to the identification of crime stains, are collected in Medical Examination Kits or a DNA Blood Sample Kit. The chain of evidence and security of sample/s placed in the kits are covered by the ESR protocol for blood sampling and storage in the laboratory. Each blood sample is assigned a unique number and it is this number that is used to identify the sample in the laboratory.[31] The ESR has adopted the "DNA Profiling Protocols and Quality Assurance Procedures" established by the US and Canadian Technical Working Group (TWIGDAM). These protocols and procedure provide minimum quality assurance standards for DNA analysis. Cameron Price comments that the existence of quality control and quality assurance protocols, coupled with the proposed evidential record sheets, should greatly assist with the general acceptance of the validity and reliablity of DNA profiles.[32]

The first sample to be obtained in an investigation results from a medical examination of the victim. This will establish the presence of offender DNA material on the victim. Blood samples may or may not be taken from victims[33] as part of medical examination (to distinguish the victim's DNA from the defender's). Where a sample is taken a protocol is completed by the medical practitioner and

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28 Interview with Ms Sue Vintner, scientist at ESR, Auckland, 22 October 1996.

29 See above Part II D.

30 Above n 28.

31 Above n 28.

32 Above n 4, 4.

33 Victims are encouraged to have such samples taken. See above n 28.

forwarded to the ESR in the Medical Examination Kit.

The ESR examines swabs from a victim immediately to determine the presence of foreign bodily samples. Blood samples from a kit are analysed within a few days. This consists of blood grouping and the DNA testing itself. The results of the groups are written in a blood grouping record book which serves as a non-computerised database for all the blood samples received by the ESR.[34]

The Police, in conjunction with the ESR, have a formalised process relating to the destruction of blood samples at the end of a case. Once the particular trial is complete and/or the judicial process is at an end (i e when the time period for the filing of any appeal has elapsed) all blood samples, including those of the victim, but excepting the sample of the convicted offender, are destroyed.[35]

Limited situations exist where there might be "very good reason" for retaining samples after this point. An example occurred in the recent Court of Appeal decision *R v Dougherty*[36] where the Court stated that (in a situation where the DNA evidence was neutral) if future refinements in DNA techniques did achieve better definition of DNA material, and that definition pointed away from the appellant's identification as the offender, justice would support further consideration of the case.

Upon disposal, the ESR forwards a form (containing details of disposal) to a police station for attention by a particular member of police to enter into the police "docloc" system.

Whole samples are not usually retained from previous enquires but the ESR does, as a matter of course, retain a sub-sample or *aliquot* from each person whose blood has been analysed, usually for blood grouping

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34 No names appear in the record book. The analyst holds a linkage between a blood reference number and an individual's name. See above n 28.

35 Above n 25, 2.

36 Unreported, Court of Appeal, CA 277/94.

only, in its laboratory. The *aliquot* is transferred to a piece of cotton cloth to be stored under frozen conditions as a blood stain. The ESR believes that the *aliquot* should be kept in the event that its evidence is questioned at a later date. It is, however, destroyed at the end of a case.[37]

DNA test results of reference samples are kept by the ESR together with the blood grouping results in the record book. A DNA record book was previously kept for each ESR laboratory - in Auckland, Wellington, and Christchurch - but this has now changed as the analytical laboratory is to be in Auckland only.[38]

Autoradiographs (or "Autorads" - negatives displaying the DNA profiles being compared) are also stored for each case. Each autorad will consist of DNA profiles from a blood sample, one or more of which may eventually be identified as coming from the offender, while some may be non-offender suspects or samples taken off the victim.[39]

G The ESR and the Crown

As mentioned above, the ESR does DNA testing on behalf of the Crown. In a country as small as New Zealand, the limitations on financial and personnel resources preclude the possiblity of independent laboratories for DNA analysis for the purposes of criminal investigations.

Cameron Price suggests that, in the light of the NRC report's[40] concern with high rates of false positives due to laboratory error as well as evidence that many forensic scientists who have testified in American courts have been reluctant to acknowledge even the

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37 All genetic information and names of suspects and victims are removed at the end of a case, and the reference samples are destroyed. See above n 28.

38 Above n 28.

39 Above n 21, 3-4.

40 National Research Council, *DNA Technology in Forensic Science*, National Academy Press, Washington DC (1992).

possibility of false positive error, an ongoing series of blind, external, proficiency tests ought to be conducted under realistic conditions. In this way the rate of false positive error associated with a laboratory or an individual technician can be measured. He acknowledges that the limited economic and human resources could be said to justifiy the non-adoption of blind or open proficiency testing of laboratories and technicians, but points out that "with the virtual lack of local competition in DNA profiling services it is desirable, or even imperative, for such proficiency tests on the near-monopoly organisations to be conducted on a regular basis."[41]

A prominent New Zealand scientist has voiced his concerns[42] that:

1) the ESR does not normally allow independent scientists to review or criticise their work, and this precludes, therefore, true "peer review".[43]

2) the laboratories of the ESR are exclusively "employed" by the New Zealand Police, i e the Crown.

3) crime scene samples and reference samples are kept in the same laboratory, and this exposes the ESR to the criticism that it is possible to 'dip' into a reference sample to achieve the desired result for the Crown.

In the light of the Criminal Investigations (Blood Samples) Act 1995[44], which now provides for blood samples required for DNA profiling to be taken under compulsion orders, the considerations mentioned above are of considerable significance. Cases involving DNA evidence are bound to increase, and considering the implications for

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41 Above n 4, 14; see also SJ Young "DNA Evidence - Beyond Resonable Doubt?" (1991) Crim L R 266 who states:"To become accepted in both the scientific and legal communities, the technique of DNA profiling must not remain under the "secretive" auspices of research laboratories..."

42 Telephonic interview, Auckland, 7 November 1996. The scientist wishes, for professional reasons, not to be named.

43 Access to DNA profiling by the defence is regulated by the "defence access protocol", devised by the police and the ESR. The ESR consider their internal quality assurance procedures to be sufficient and therefore expect the defence to accept their results. See above, n 42.

44 See below Part VI.

an accused if a positive result is reported by the ESR, it is of paramount importance that an expert scientist acting for the defence be allowed full access to and scrutiny of all records concerning such DNA profiling. It is also possible that the ESR may be urged in future to ensure that crime stain samples and reference samples are kept in separate laboratories.[45]

III INTERPRETING DNA EVIDENCE

A Declaring a Match

The first stage in the interpretation of DNA profiles is the declaration of a match. If two profiles that are compared do not match, then the suspect can be eliminated from the investigation. If the two profiles do match, then the significance of the match must be assessed through the calculation of a "match probability". For a variety of reasons, matching is not an easy process. A common problem at the matching stage is "band-shift". During electrophoresis two DNA samples which come from a common source may move through the gel at different speeds and this will produce two similar profiles, but all the bands in the one profile will be slightly higher on the autorad than the bands on the other. In such a situation the scientist will be tempted to ignore the discrepancy and declare a match.

An even more serious problem, at the matching stage, is where one profile matches the other at several loci, but there are discrepancies in the number of bands between the two profiles. A scientist may decide to interpret some bands as "artefactual bands" i e as bands arising from problems in the preparation of the DNA profile rather than from genetic differences between the two samples. An example of this occurred in the English case, *R v Deen*[46], demonstrating the subjective nature of DNA comparison. There may be

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45 This would be possible as the ESR has laboratories in Auckland, Wellington and Christchurch, but it has recently been decided to have the analytical laboratory for DNA testing only in Auckland. See above n 28.

46 Court of Appeal, 21 December 1993.

a considerable amount of human judgement involved and this means that a scientist who carries out the interpretation of a DNA profile makes decisions which are prejudicial to a defendant.[47]

An accepted method of deciding when two bands are at the same position on a DNA profile has been a process called "match/binning" which involves declaring a match between two bands when they fall within a certain distance of each other - a "bin"- on the autorad. The use of bins to provide a rigid cut-off point is seen as artificial, as it is accepted that a scientist may decide to score a match even when two bands fall slightly outside a bin. However, tiny differences in band positions could tilt the evidence from incriminating to excluding.[48]

It is also possible for gross error to occur during the process of preparing DNA profiles. For example, if samples are confused or mislabelled by the police or laboratory staff, scientists may end up comparing two samples from the same source in a case where the suspect is not the perpetrator. In the United States some commentators claim that the few forensic science proficiency tests which have been published support the contention that false positives occur in a significant number of cases.[49]

B Assessing the Significance of a Match

Once a match has been declared the expert has to make a decision as to the significance of the match having occurred by chance. The finding of a "match", on its own, can be a piece of misleading and meaningless evidence. It can only make sense if the chance of a match in the general population is compared. Scientists therefore need some knowledge of the frequency with which the alleles represented on the autorad occur within a population. A knowledge of statistical

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47 M Redmayne "Doubts and Burdens: DNA Evidence, Probability and the Courts" (1995) Crim L R 466.

48 Above n 47, 467.

49 Above n 47, 468.

principles and population genetics is needed for this. The population geneticist determines the frequency with which a specific allele occurs within a given human racial group. The probability of coincidental matching is obtained from databases which determine the frequency of a DNA profile in the population.[50]

At the time when the Criminal Investigations (Blood Samples) Bill was being considered, the Department of Justice was informed by ESR scientists that the probability of the profile of the crime scene sample matching the profile of a person other than the offender (a chance match) for single-locus profiles is typically reported as one in several millions. This has been determined on the basis of local population databases which have been compiled by the ESR.

DNA studies have established that the frequency of particular bands being shared in the population varies between ethnic groups. This is particularly true of the highly sensitive single-locus probe bands. Some alleles are more common in some groups than in others. This affects DNA statistics. If a suspect is compared against their ethnic group, the likelihood ratio will probably decrease, because the denominator is likely to be higher if the bands are more common. For each of the single-locus probes to be used, the proportion of the different bands in the relevant populations must be determined. Once this is done, the probability of getting that band if the bloodstain came from a random member of that population can be used to determine a likelihood ratio.

Robertson and Vignaux argue that a database drawn from the accused's racial group should only be used if a person from that racial group could have been the perpetrator if the accused were not. It will therefore depend on what is known of the perpetrator. If nothing is known about the perpetrator a database drawn from the general population should be used.[51]

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50 Above n 4, 15.

51 B Robertson and GA Vignaux *Interpreting Scientific Evidence* Seminar of Auckland District Law Society (Auckland, 17 October 1996) 4.

C Baye's Theorem and the Likelihood Ratio

DNA evidence attempts to establish the likelihood that, when a possible match is declared between the DNA profiles of a crime stain and of a suspect, the crime stain may have come from the suspect and not from some other individual. This evidence has to be weighed by the jury along with all the other evidence in the case and cannot be viewed as a certainty on its own account.[52]

The Bayesian probability theory, Baye's Theorem[53], which is based on the ability to quantify uncertainty, has found favour in the UK and New Zealand although it has not been adopted in criminal cases in Australia and the USA.[54] Forensic scientists in New Zealand now present DNA evidence using this approach. Baye's Theorem considers two or sometimes more alternative hypotheses. One view is that of the prosecution that the defendant committed the crime. The other view, that of the defence, is that he did not. The scientific evidence will alter the odds in favour of the prosecution or the defence. Baye's Theorem establishes that the odds after the scientific evidence are given by the odds prior, multiplied by a factor known as the "likelihood ratio".[55] The likelihood ratio is calculated as: the probability of the evidence supposing the assertion is true, divided by the probability of the evidence if the assertion is not true. The probability of the evidence if the assertion is not true, is the denominator. When we divide them we get a single figure, a ratio which tells us the strenghth of the evidence in supporting our hypothesis. If the likelihood ratio is more than 1 the evidence tells in favour of the hypothesis. If the ratio is less than 1 the evidence tells against the hypothesis.[56]

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52 Above n 4, 15.

53 Discovered by Reverend Thomas Bayes (1702-1761). See above n 11, 17.

54 Above n 4, 20. Price points out that the New Zealand Law Commission incorporated Bayesian principles in their discussion paper on the proposed reform of the Evidence Act.

55 Above n 3, 14.

56 See also n 51, 3.

Baye's Theorem also tells us how to update our knowledge by incorporating new evidence. We start with some knowledge about the hypothesis, expressed as odds in favour of it. These are known as prior odds. The prior odds (our assessment without the evidence) must be multiplied by the likelihood ratio of the new piece of evidence to give the posterior odds:[57]

prior odds x likelihood ratio -> posterior odds

The prior odds are determined by reference to other evidence in the case and are hence a matter for the jury and not for the witness. The posterior odds are what the jury has to decide on before deciding whether to convict. The witness is concerned only with the likelihood ratio.[58] An expert scientist giving evidence of DNA profiling cannot assess the probability that the accused was present or that an event occurred. The witness can only give a likelihood ratio for the evidence on the basis of the hypothesis.[59]

In a recent English case, *R v Adams*[60] the prosecution gave evidence of the results of a DNA test in the form of a likelihood ratio. The jury were then instructed by the defence as to the method of combining that evidence with all the other evidence in the case by applying Baye's Theorem. This method was accepted previously by the Lord Chief Justice in *R v Deen*.[61]

Cameron Price does not share Robertson and Vignaux's enthusiasm for Baye's Theorem. He feels that to attempt to reduce all evidence to a numerical weighting is misguided and must be discouraged before it becomes adopted as a standard. He states that it is the function of the judge and jury or judge-alone to weigh the evidence and decide on guilt or innocence. Statistics will continue to have a part to

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57 Above n 4, 22.

58 Above n 51, 6; see also n 11, 16-21.

59 Above n 51, 8.

60 Referred to by Robertson and Vignaux, above n 51, 10.

61 CA, 21 December 1993.

play in separate items of evidence but should not be an attempt to solve the ultimate issue by combining all evidence into mathematical terms. He has no quarrel with the fact that the ESR has shown a preference for presenting DNA profile evidence in the format of a likelihood ratio but insists that: "....the combination or multiplication of those separate weightings by expert witnesses with a statistical bent, has no place in our legal system".[62]

IV DNA EVIDENCE AND THE COURTS

A The First Cases

In October 1987 a man was convicted in Birmingham Crown Court of a rape committed a year earlier. The press described this as the first time that DNA fingerprint evidence had been given in a British court. However, the first practical application of this technique in the criminal context is believed to be the case of *Pitchfork*.[63] In this case DNA evidence was used not only to exculpate someone but also to find the guilty person. Two girls were raped and murdered in neighbouring villages in Leicestershire. The police believed that a 17 year old youth was responsible for both murders. DNA evidence demonstrated that although the same person was responsible for both murders, since semen found on both bodies had the same DNA fingerprint, the accused was not the person. The DNA fingerprint obtained from his blood did not match that obtained from the semen. He was released after three months in custody.

The police, believing a local man to be responsible, asked all male inhabitants of the area between 13 and 30 years of age to give a blood sample for DNA fingerprinting. A total of five and a half thousand people did so. Colin Pitchfork persuaded a workmate to substitute his own blood sample but this information soon reached the

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62 Above n 4, 24.

63 RM White JJD Greenwood "DNA Fingerprinting and the Law" (1988) The Modern Law Review 148.

police. Pitchfork eventually gave a blood sample, apparently voluntarily, and this produced a DNA fingerprint identical to that produced by the semen samples. Pitchfork pleaded guilty to both rapes and murders and was sentenced to life imprisonment. Prior to his deception coming to light the police admitted that despite 7,300 statements, 25,000 computer entries, and a $20,000 reward, they had no leads. If DNA profiling had not been available the original suspect might have been wrongly convicted and Pitchfork would have escaped detection.[64]

Since late 1987 many cases have come before the English and American courts. While *Pitchfork* was the first criminal case in which DNA fingerprinting was employed, the first conviction obtained solely on the basis of a DNA fingerprint occurred in the United States. On 6 November 1987 Tommie Lee Andrews was convicted of aggravated battery, sexual battery and armed burglary of a dwelling, on the basis of evidence, supported by two experts' testimony, that his DNA fingerprint matched that produced by a semen sample recovered at the scene. Less than a week later the first English conviction to result from DNA fingerprinting was secured when Robert Melias pleaded guilty in Bristol Crown Court to the rape of a 43 year old disabled woman.[65]

B Admissibility of DNA Evidence

1 Other countries

In the criminal courts of the USA there has been widespread use of DNA profiling. With a few exceptions the courts have endorsed DNA testing and admitted the results in evidence.[66] In making this determination most American courts relied on what is known as the

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64 Above n 63, 150.

65 Above n 7, 130.

66 Above n 25, 4.

"Frye test".[67] The application of this test means that before the results of a scientific discovery can be admitted into evidence the reliability of the discovery has to be accepted by most experts working in that field. Over 30 "Frye" hearings on the admissibility of DNA evidence have been held throughout the United States and with rare exceptions the courts have found that DNA testings meet the Frye criteria. Jurisdictions that have scrutinised DNA evidence most carefully before allowing its presentation to the jury have usually applied a "three-prong " Frye test, of which *People v Castro*[68] is an example. Prong one of the Frye test asks: "Is there a theory, which is generaly accepted in the scientific community, which supports the conclusion that DNA forensic testing can produce reliable results?" Prong two asks "Are there techniques or experiments that currently exist that are capable of producing reliable results in DNA identification and which are generally accepted in the scientific community?" Prong three asks: "Did the testing laboratory perform the accepted scientific techniques in analysing the forensic samples in this particular case?" In a number of jurisdictions the traditional two prong Frye analysis for DNA admissions, which was more lenient toward the admissibility of DNA, was employed. In such cases expert testimony to the effect that generally acceptable DNA testing procedures were not properly performed in the specific case at hand is treated as bearing on the weight that the jury should accord to the DNA evidence.[69]

The case of *People v Castro*[70] established that the theory underlying DNA profiling is generally accepted by the scientific community and that the current techniques for carrying out profiling procedures are also generally accepted as capable of giving reliable results.

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67 CC Shank "DNA Evidence in Criminal Trials" (1991) Arizona Law Review 848; see also JS Kotval "Public Policy for Forensic DNA ANalysis: The Model of New York State" in PR Billings (ed) *DNA On Trial* 112.

68 545 N.Y.S 2d 985 (N.Y.Sup.Ct. 1989).

69 DA Gass and MM Schultz "An Analaysis of Decisional Law Governing the Use of DNA Evidence (As of January 1992)" in PR Billings (ed) *DNA on Trial* 44.

70 Above n 68.

The principles established in *Castro* were confirmed in the first USA Federal Court of Appeal's decision on the admissibility of DNA evidence, namely *US v Jakobetz.*[71] In that case it was held that a court could properly take judicial notice of the general acceptability of the theory of DNA and the use of specific DNA profiling techniques. Since then, in *Daubert v Merrell Dow,*[72] it was held that the Frye test has been superceded by the Federal Rules of Evidence 1975, which imposes a less exacting test as to admissibility.[73]

The general position of English law as to the admissibility of scientific evidence is that there is no special test or threshold issue requirement applicable to the determination of admissibility. The evidence need only meet the traditional requirements of relevance and helpfulness. In England and Wales, therefore, it is for the court to decide whether the field of learning has or has not developed to such a point that it is one upon which a person of appropriate qualification can give expert evidence. The way in which this is done is very much up to the individual judge. The current position in English law is to subject the expert witness to cross-examination, put up a defence expert to contradict the evidence if possible, and leave it to the jury to decide the value of the evidence. This approach has the disadvantage of prejudicing and confusing the jury by the parade of scientific evidence.[74]

In Australia the approach, as shown in the case of *R v Tran*[75], is that technical errors by forensic scientists affect not weight, but admissibility. In this case there were a number of problems in the DNA evidence with regard to the management of the tests, their

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71 (1992) U.S. App LEXIS 322; see also n 3, 26.

72 113 S.Ct. 2786 (1993).

73 See Rules 402,401,702. The Supreme Court said the Frye test was inconsistent with Federal Rules, and should therefore not be applied in federal trials.

74 P Alldridge "Recognising Novel Scientific Techniques: DNA as a Test Case" (1992) Crim L R 692.

75 (1990) 50 A Crim R 233.

accuracy and the population genetics, and this led the judge to conclude that to admit the evidence would have been to invite the jury to speculate.[76]

2 New Zealand

(a) Prima facie admissible

In New Zealand the case of *R v Pengelly*[77] established that, prima facie, DNA evidence is admissible for evidential purposes. Notwithstanding the prima facie admissibility of DNA evidence, its admissibility in any particular case, or the weight to be attached to it if established, may depend upon whether the reliability factors listed above have been established to the court's satisfaction. Prior to 12 August 1996, when the Criminal Investigations (Blood Samples) Act 1995 came into force, admissibility also depended on other considerations, such as whether a suspect's blood sample was lawfully and voluntarily obtained in the first place by the law enforcement agency concerned.[78]

In every case it is for the judge to rule on the admissibility of DNA evidence and to instruct the jury on how the evidence should be treated. The legal position is essentially the same as for the reception of other forensic evidence.[79] Cameron Price has made the interesting comment that New Zealand has, in its judicial acceptance of DNA profiling, largely ignored the critical debate on and intense scrutiny of the validity and reliability of the procedures and assumptions forming part of DNA profiling and its interpretation.[80]

(b) The issue of informed consent

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76 Above n 74, 692.

77 Above n 2.

78 Above n 3, 26.

79 Above n 25, 4.

80 Above n 4, 1.

The Criminal Investigation (Blood Samples) Act 1995, which came into force on 12 August 1996, provides for the police to apply for a compulsion order in the case where a person suspected of certain offences refuses to supply a blood sample for the purpose of DNA testing.[81]

Prior to 12 August 1996 the taking of blood samples depended on informed consent. If such consent was not obtained, the results of any DNA profiling resulting from the sample would not be admissible. This issue was dealt with in two cases, namely *R v Montella*[82] and *R v Pengelly*[83]. In *Montella* a very prescribed and limited consent was given for a specific purpose only. This was on the advice and through the medium of the accused's defence counsel. In *Pengelly* a general consent was sought and given to the provision of bodily samples for the purpose of forensic examination within the context of a homicide inquiry. The issues of informed consent were therefore different in the two cases.[84]

In *R v Montella* the central dispute was whether consent to DNA testing had been given at all. Blood samples were taken from a man who was accused of having anal intercourse with an 11 year old boy. It transpired later that the accused's counsel had advised him to provide a blood sample only for the purpose of AIDS testing. It was therefore held that the accused had not consented to a medical examination for general forensic purposes in the context of any criminal charge he might face. The DNA evidence was therefore held to be inadmissible.

In *R v Pengelly*[85] defence counsel argued that the blood sample taken from the accused during a medical examination at the police station

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81 See above Part VI.

82 (1991) 7 CRNZ 258.

83 Above n 2.

84 Above n 3, 35.

85 Above n 2; see also n 3, 35.

was not obtained by an informed and voluntary consent. The accused, a 17 year old youth, agreed to provide a blood sample and fingernail scrapings and was under no misapprehension as to the context in which the police request for forensic samples had been made of him. Defence counsel argued that although the accused was asked for his consent he was not informed of his right to grant or withhold his consent, and that the implications of DNA testing were not explained to him. The Court of Appeal held that sufficient information had been given to the accused to make it obvious that the purpose for which the blood samples were being requested from him by the police was to ascertain whether or not they would match bloodstains found at the scene of the homicide.

The decision in *Pengelly* has been criticised by WJ Brookbanks[86] who argues that the Court of Appeal failed to recognise the unique character of DNA as a form of forensic analysis. He feels that because of the probative and inculpatory nature of DNA profiling, the accused person ought to be fully informed as to the possible outcome of sample analysis, as well as his right to refuse to consent, before consent to the procedure is given.

In future, however, the issue of informed consent will no longer be an issue because of the provisions concerning compulsion orders in the new Act.

V CHALLENGING DNA EVIDENCE

A The Initial Reaction

The initial application of DNA technology to criminal investigations in 1987 had a dramatic impact. The spectacular nature of the investigation leading to the conviction of Colin Pitchfork in 1987, coupled with the enthusiasm of the companies which were set up to market the technique, caught the imagination of both the police and

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86 WJ Brookbanks "DNA Profiling and Informed Consent in Criminal Investigations" (1992) NZLJ 125.

the press. The often faint, fuzzy and distorted bands produced on autoradiographs were likened to the precise and unambiguous patterns of supermarket bar-codes. The process was stated to be incapable of yielding a false match. Defendants confronted with DNA evidence "rolled over" and pleaded guilty. In the United States it was said that "everyone just sort of lay down and died".[87] This was followed by a period in which prosecution experts were cross-examined but no defence experts were called. Such efforts were understandably lacking in success.

In 1990 Andrew Hall wrote that "there appears to be a feeling on the part of [English] lawyers that the accuracy of DNA fingerprinting makes it a waste of time and effort to try to challenge positive identification",[88] and he commented that the result of the Australian case *R v Tran*[89] had particular relevance for such lawyers, not least because the evidence in *Tran* was again prescribed by Cellmark Diagnostics, one of the two organisations conducting DNA profiling in England. And in 1992 Peter Alldridge stated that in England, ".....what appears to have happened is that the mere mention of DNA evidence for the prosecution has generated guilty pleas".[90] David Farrington commented that "This country [England] has been remarkably lax in its examination and questioning of DNA evidence within the criminal court system. DNA has been allowed a mystique which is undeserved."[91]

It is also believed (or rather, feared) that lay jurors may be overly influenced by laboratory tests and scientific jargon, and that they are not able to properly combine the statistical evidence with all the other evidence in the case. Most lawyers are hardly qualified to

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87 N McLeod "English DNA Evidence Held Inadmissible" (1991) Crim Law Review 583.

88 A Hall "DNA Fingerprints: Black Box or Black Hole?" (1990) N.L.J. 20-204, 213 at 204. see also n 87, 384.

89 Above n 75.

90 Above n 74, 688.

91 D Farrington "Unacceptable Evidence" (1993) New Law Journal 806.

properly assess and challenge DNA evidence, and yet they need to have a clear appreciation of the contentious points to be able to cross-examine an expert and challenge aspects such as the testing procedures and band matching.[92] It is also widely known that there is a disparity in the resources available to the defence to challenge scientific evidence.[93]

B Other Countries

1 People v Castro[94]

Castro's case in the USA was the turning point. This case represented the first serious challenge to the validity of DNA profiling evidence. In this case Jose Castro, a 38 year old Hispanic, was accused of murdering his neighbour and her two year old daughter. Both victims were stabbed to death. A small bloodstain on Castro's watch was analysed by Lifecodes Corp. which reported that the DNA bar code pattern from the blood of one of the victims matched that on the watch. Four of the expert witnesses representing both the prosecution and defence met to review the scientific evidence after they had already testified. The result of the meeting was a two page consensus statement that addressed the inadequacy of the scientific evidence. The court applied a three-pronged test to determine the Frye standard, and held that the DNA evidence failed the third prong of the test and that the evidence was therefore inadmissible, "since testing laboratory failed in several major respects to use generally accepted scientific techniques and experiments for obtaining reliable results within reasonable degree of certainty".[95]

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92 V Hammond *DNA Evidence*, LLM Research paper, Victoria University of Wellington, 1991, 40; see also n 67, 867.

93 Above n 88, 204.

94 Above n 68.

95 It is interesting to note that the case was never tried and that Castro pleaded guilty to murder in late 1989. See RG Frederico "'The Genetic Witness': DNA Evidence and Canada's Criminal Law" (1991) Crim Law Quarterly 223.

2 *R v Tran*[96]

In Australia lawyers were also initially nonplussed by the new evidence. After the extraordinary events in *Castro*, however, the first challenges emerged. In 1990 the admissibility of DNA evidence was unsuccessfully challenged in New South Wales in *R v Elliott*[97] and in Tasmania in *R v Brown*[98]. In both cases the defence called experts qualified to give evidence on DNA profiling techniques and statistics but lacked an expert in statistic interpretation of population genetics. Finally, in *R v Tran*[99], heard in the New South Wales Supreme Court in October 1990, the challenge to the admissibility of the prosecution evidence was successful.

The *Tran* case involved the rape and murder of Sandra Peresan in 1988. The police arrested a Vietnamese man, Van Hung Tran. Samples were sent for DNA profiling to Cellmark Diagnostic in Oxfordshire and these included three marginal swabs and one blood sample from the body of the deceased and blood samples from the deceased's boyfriend (who was with her when she was attacked and had just before had sexual intercourse with her) and Tran. These samples were subjected to four separate tests, each being a distinct "single-locus" probe. The defence called a number of expert witnesses who successfully challenged the prosecution DNA evidence on three bases; firstly as to the manner in which the profiling techniques were actually excuted, eg concern was expressed at the running of the suspect and the crime scene samples in adjacent gel bases; secondly, on the interpretation of the results obtained in respect of whether the track containing the crime scene sample contained two extra faint bands matching those of the accused or only one; and thirdly that the interpretation of the results had relied upon statistical data for Afro-Caribbeans in calculating the chance of a match with the accused

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96 Above n 75.

97 No 70154/89 unreported judgment on the vore dire re DNA testing delivered on April 6 1990 by Hunt J.

98 No 22/2990 unreported judgment of Wright J, June 20 1990.

99 Above n 75.

where there had been identification evidence that the offender was Oriental. Such was the disagreement and uncertainty between the experts on the second point that no jury could really be assisted at all by the DNA evidence and the court therefore ruled it inadmissible. Tran was convicted on the basis of other evidence led by the crown.

However, *Tran's* case, following on from *Castro*, made it clear that DNA evidence can be challenged. The disagreement among experts from Cellmark and those appearing for the defence as to appropriate procedures and safeguards showed the need for agreed scientific standards with regard to DNA profiling.[100]

C New Zealand

1 R v Pengelly[101]

R v Pengelly was the first case in which evidence of DNA profiling had been led in a criminal trial in New Zealand. The accused, who was 17 years old, was convicted of the murder of a 77 year old woman. The victim's home had been entered via a louvre window, and she had received multiple injuries from being beaten and stabbed. The accused's finger and palm prints were found on the louvre windows, and there were also blood stains at various places in the house that were sufficient for analytical purposes. A sample of blood was obtained from the accused and subjected to DNA profiling. The strength of the Crown case depended on much more than the DNA evidence. The DNA profiling was done by Dr Margaret Lawton of the DSIR who gave evidence that the results she obtained from the autorad showed that it was 12,450 times more likely that the blood originated from the accused than if it had originated from someone else. [102]

After Pengelly was convicted the expert scientist for the defence,

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100 Above n 3, 28.

101 Above n 2.

102 Above n 3, 28.

Dr Arie Geursen, filed an affidavit stating that, in his opinion, the DNA profile results prepared by Dr Lawton were very poor in quality and should not have been admitted at the trial. Prior to the trial Dr Geursen visited the DSIR laboratory, perused the complete file of working data,[103] and viewed the autorad containing three different crimestain blood samples (Exhibit C) obtained from the kitchen floor and from a net curtain inside the murder victim's house. The defence counsel, Mr Murray Gibson, then sought orders under s 389 of the Crimes Act 1961 to appoint Prof Alec Jeffreys (the pioneer of the DNA profiling technique) as an assessor to assist the Court. Prof Jeffreys was not able to come to New Zealand but he made a report on Exhibit C. His opinion was that the quality of the DNA profile was very poor and he stated that to his knowledge, evidence of this degree of poor quality had never been admitted in any United Kingdom Court! At Prof Jeffrey's suggestion, and on the basis of further advancements in sensitivity of the DSIR's own DNA profiling techniques, Dr Lawton carried out further analyses of the crimestain blood samples from the kitchen floor and net curtain. These results were infinitely clearer and were forwarded to Prof Jeffreys for examination and comparison with Exhibit C. This resulted in a further report from Prof Jeffreys. He commented that the new profiles were of a quality fully compatible with that obtained by other forensic laboratories and that the DNA profiles from the curtain stain and from the accused were indistinguishable throughout the track. He concluded that "the results of the new analyses carried out by Margaret Lawton establishes beyond any reasonable doubt that the blood samples obtained from the kitchen and from the curtain originate from Pengelly." These later tests and affidavit of Prof Jeffreys were admitted at the appeal.

The significant point in this case is the fact that Exhibit C was of a quality so poor that it should not have been admitted in evidence. Yet, as the court did not know this, it was accepted as positive evidence to support the Crown's case. There would have been no

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103 This is an exception to the rule. The files of the laboratory are not normally made available to independent scientists acting for the defence. Information from Dr Arie Geursen, telephonic interview, 8 November 1996.

objection to this evidence if it had not been for the intervention of the expert scientist called by the defence counsel.

2 *R v Dougherty*[104]

New Zealand's most dramatic and publicised case involving DNA evidence, *R v Dougherty*, turned around the difficulty of the defence counsel to exculpate the accused or to establish reasonable doubt. It is also a case in which scientific evidence of the ESR almost went unchallenged. On 20 August 1996 David Dougherty was released from prison after serving three years of his seven years and nine months jail sentence which was imposed on him in June 1993. He had been found guilty of abducting and raping an 11 year old girl in West Auckland in October 1992. The reason for his release was a Court of Appeal decision to quash his convictions and order a retrial (scheduled for February 1997[105]) in the light of scientific interpretations which contradicted the one which was put before the court in the previous appeal.

In the first court case a scientist from the ESR, Ms Susan Petricevic, gave evidence that she examined six swabs in the medical examination kit as well as a pair of pyjama pants and underpants worn by the complainant, and found seminal fluid only on the items of clothing. The amount was, however, insufficient for DNA profiling. Dougherty was convicted on the evidence of the complainant.

The complainant stated that she was awoken in her bedroom early in the morning by a person whom she recognised as her neighbour by his voice. She was gagged and blindfolded and taken to a nearby open area where was was raped. She said that the blindfold slipped sufficiently to allow her to see the assailant's face for about 20 seconds. Dougherty was seen by the police the next morning and he was adamant that he had stayed home on the night in question. He not only agreed, but was in fact very eager, to provide the police with bodily

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104 Unreported, Court of Appeal, CA 231/96.

105 Interview with defence counsel, Mr Murray Gibson, Auckland, November 1996.

samples, declaring that he was sure that tests would establish that he was not the offender.

Shortly after the trial, in September 1993, Dr Peta Stringer informed Crown counsel that a new DNA technique called DQA-1 had been introduced into laboratories of the ESR in New Zealand and could give results for samples which previously had too little DNA to analyse. Defence counsel was informed and samples that had been obtained from both the complainant and appellant were retested by the ESR. Dr Peta Stringer carried out the analyses on DNA samples from the complainant's pyjamas and underpants, and from the swabs taken from her by the doctor who examined her the following afternoon and completed the sexual assault kit.

In October 1994 Dougherty's appeal was heard by Justices Eichelbaum, Gault and Thorp. The defence team, consisting of Simon Lockhart QC and Robin Brown, relied on the new evidence consisting of Dr Stringer's report. Dr Stringer reported the results of the DNA on the underpants as being 1.2, 3, *4, where *4 meant "The 4 allele detected was very weak. The signal intensity of the reactions obtained for alleles marked with the asterisk(*) are such that they do not fulfil the criteria required for a positive result as laid down by the manufacturer of the chemical kit used to perform these analyses. The explanation of results given however takes the presence of these weak alleles into account because of laboratory experience." Her report went on to claim that the DNA on the underpants could have been contributed to by two or more persons who would include the appellant (whose genotype is 1.2., 4) but not the complainant's (1.2, 2). The Court dismissed the appeal, relying heavily on Dr Stringer's findings of DNA matching Dougherty's type without advancing any theories as to the presence of a third person's DNA on the garment:

> As we assess the results of the additional tests, they certainly do not reduce the factors linking the appellant to the offending, but rather point the other way: and the fact that one of a number of tests has located DNA from some third party on one of the complainant's garments, without more, cannot be said to have such cogency as to justify our vacating the jury's verdict.

Quite by chance, on the day the judgment was delivered, a lawyer, Mr Murray Gibson, and a scientist, Dr Arie Geursen, happened to be at

the High Court and heard about the case.[106] Dr Geursen was concerned about the scientific evidence, as he felt that DNA evidence could not at the same time point in the direction of the appellant and away from him. He subsequently got hold of a report of the judgment to find out the details of this evidence, and he and Mr Gibson decided that they wanted to do something about what they considered to be a miscarriage of justice. Further legal aid was refused, but both Mr Gibson and Dr Geursen decided to work on this case without remuneration.[107] Although ESR scientists do not normally allow independent scrutiny of their work, Dr Stringer allowed Dr Geursen to inspect her file on the case. He found that he disagreed with her findings. A test on the underpants showed a result corresponding to genotype 1.2, 3. Allele 3 could not have come from Dougherty or the complainant.

In September 1995 Dr Geursen dispatched photos of the test strips to two international experts in the DQA testing technique, namely Dr Stephen Gutowski at the Victoria Forensic Science Centre in Australia and Dr Rebecca Reynolds, section manager of the Human Identity Group at Roche Molecular Systems in California.[108] Dr Gutowski reported that in his opinion there is no irrefutable genetic evidence to link Dougherty with any of the material typed in this case. There is reliable genetic evidence to implicate another person, not being Dougherty.[109] Dr Reynolds said in her report: "The contributor of the seminal fluid stains in the victim's underpants and pajamas is a person with a DQA1 type of 1.2, 3. The appellant cannot possibily be the source of the stains because his type is 1.2, 4." She also stated that the weak 4 signals reported by Dr Stringer were not reliable indicators of the presence of additional alleles.[110]

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106 Mr Gibson and Dr Geursen had been defence counsel and expert witness respectively in the *Pengelly* case. See above Part V C 1.

107 Above n 105.

108 Dr Reynolds offered her services free of charge and the fees of Dr Gutowski were paid by Mr Gibson himself. See above n 103.

109 Affidavit by Stephen Gutowski, 25 July 1996.

110 Affidavit by Rebecca Reynolds, July 26 1996.

Mr Gibson tried to have the case reopened and approached the Governor-General, supporting the application with affidavits from Dr Gutowski, Dr Reynolds, and Dr Geursen. In his affidavit,[111] Dr Geursen criticised the interpretation reported by Dr Stringer and stated that in his opinion the results of her work excluded Dougherty as having contributed to the seminal stain on the underpants and pyjamas.

The Court of Appeal held that the totality of the evidence now available gave a materially different picture from that considered by the court in 1994, and that a new trial should be held. "We consider it is essentially a jury task to evaluate all of the evidence previously given in the light of the scientific evidence now available." Dougherty was granted bail and was released from prison after serving three years of a seven years and nine months sentence.

VI THE CRIMINAL INVESTIGATIONS (BLOOD SAMPLES) ACT 1995

A Background

Until the Criminal Investigations (Blood Samples) Act 1995 ("the Act") came into force on 12 August 1996 the police had no specific statutory authority to obtain body samples for DNA testing. The Police Act 1958 allows the police to take "particulars" of any person who is in lawful custody and who has been charged with an offence, but such "particulars" do not include blood samples. In the absence of express statutory authority, the legality of taking a blood sample therefore depended entirely on consent.[112]

In 1978 the Criminal Law Reform Committee issued a report entitled "Bodily Examination and Samples as a Means of Identification". It recommended a statutory procedure enabling a police officer to apply

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111 Dated 26 July 1996.

112 K Dawkins "Criminal Investigations (Blood Samples) Act (1996) NZ Law Review 31.

to a judge for an order authorising the obtaining of a sample of blood, saliva, hair, nail clippings and scrapings, and fingerprints from a suspect. The proposals attracted some interest, but were not enacted.[113] In early 1988 the Criminal Investigations Bill was introduced but because of considerable opposition it did not proceed very far through the legislative process. In 1992 the then Minister of Police, John Banks, put forward a proposal to enact legislation empowering the police to take blood samples for the purposes of forensic testing. This proposal resulted in the reinstatement of the 1988 Criminal Investigation Bill.[114] In 1994 the Government agreed to the addition of provisions relating to the establishment of a DNA databank for defined law enforcement purposes.[115] The eventual enactment of the Criminal Investigations (Blood Samples) Act 1995 was made possible by the renewed interest in DNA testing as a result of the South Auckland Rape Inquiry ("Operation Park").[116] The Act only came into force on 12 August 1996, and the delay was due to the fact that administrative regulations first had to be prepared for the police and forensic experts.[117]

The Act has three principal purposes. Firstly it codifies procedures that will govern the taking of blood samples by consent for DNA analysis. This part of the Act formalises existing practices and procedures, although there is now a detailed prescription of the particulars that must be conveyed to a suspect who has been requested to provide a blood sample. Secondly the legislation provides for the police to obtain a blood sample from a person who is suspected of having committed a certain type of offence and to use that sample for the purposes of confirming or disproving that person's involvement

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113 N Trendle "DNA, The Modern Fingerprint" in FWM McElrea (ed) *Re-thinking Criminal Justice* vol II, May 1995, 7.

114 Above n 4, 36-37.

115 Above n 25, 1.

116 Above n 112, 31; See also Hansa Reports, Parliamentary debates on the Criminal Investigations (Blood Samples) Bill: 12 Oct 1994, 9-10 August 1995 and 29 Nov 1995.

117 Telephonic interview with legal adviser of the Department of Justice, 20 March 1996.

in the commission of the offence. Thirdly it authorises the establishment of a databank of DNA profiles for use in the investigation of crime.[118]

During the passage of the legislation the Justice and Law Reform Committee received 22 submissions on the bill. The main topics of comment were the following: 1) Reliability of DNA testing; 2) Individual Rights); 3) Use of Force and 4) Scope of Databank.[119]

B Reliability of DNA Testing

There were four submissions to the Justice and Law Reform Committee on the issue of the underlying reliability of DNA analysis. Dr Andrew Dowsett[120] stated that the accuracy of DNA analysis is unknown and subject to extensive scientific debate. He acknowledged that DNA profiling can be a powerful tool but suggested that the bill appeared to give "genetic fingerprinting" legal standing beyond that which is warranted by the scientific merits of the technique. Dr Dowsett pointed out that New Zealand is clearly a follower in the development of this technology as most of the pioneering research on the use of DNA profiling is going on in England and the United States. For this reason it is "ill-advised" for New Zealand to take leadership instead of being a follower of international legal trends.

The New Zealand Council for Civil Liberties[121] raised concerns about the interpretation of sample results and the possibility of conflicts between expert witnesses, and the Auckland Council for Civil Liberties[122] pointed out that it is an investigative tool with limitations to its validity and reliability. The ESR stated that

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118 Above n 113, 7.

119 Above n 25, 1.

120 *Submission to the Justice and Law Reform Committee*, 16 January 1995, 3.

121 The New Zealand Council for Civil Liberties, *Submission to Justice and Law Reform Select Committee*, 1-2.

122 The Auckland Council for Civil Liberties (Inc), *Submission to the Justice and Law Reform Committee*, 6 March 1995, 2.

although DNA profiling results are not definitive, they do provide a very high level of corroborative evidence.

The Department of Justice made it clear, however, that the bill did not affect the admissibility of DNA evidence per se or provide any legal standing for it in the trial context. The major purpose of the bill was to provide a regime that allowed the police to obtain blood samples for analysis in certain defined circumstances. Although this implicitly acknowledges that there is considerable value for law enforcement purposes in obtaining such evidence, the bill did not determine the weight that should be ascribed to DNA evidence in general or in any particular case.[123]

C Compulsion Orders And The Use Of Force

1 The statutory provisions

Section 13 of the Criminal Investigations (Blood Samples) Act provides for an application to be made to a High Court Judge for an order requiring a suspect, who is of or over the age of 17 years, to give a blood sample. There must be "good cause to suspect that the suspect has committed a relevant offence" (subsection (1)(a)), and the suspect must have refused to consent to the taking of a blood sample (subsection (10(b)). Section 16 provides that a High Court Judge may make a "suspect compulsion order" requiring the respondent to give a sample of the respondent's blood if he is satisfied that certain requirements are met. These include the fact that there is "good cause to suspect that the respondent has committed the relevant offence (subsection (1)(a)), that there are reasonable grounds to believe that analysis of a blood sample taken from the respondent would tend to confirm or disprove the respondent's involvement in the commission of the offence (subsection (1)(c)), and that in all the circumstances "it is reasonable to make the order" (subsection (1)(e)). Section 23 provides for a similar compulsion order in the case of a suspect who is between 14 and 17 years of age.

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123 Above n 25, 2; see also Part III B 2.

Section 54 sets out the procedure for taking a blood sample pursuant to a compulsion order. The person from whom the blood is to be taken has a choice of whether he wishes to have the sample taken by way of a venous sample or a fingerprick sample (subsection (1)(a)). He is also to be informed of what will happen should he refuse to have a blood sample taken (subsection (1)(b)). Should the person refuse to allow a blood sample to be taken in accordance with the compulsion order, "a member of the Police may use or cause to be used reasonable force to assist a medical practitioner to take a fingerprick sample from that person" (subsection (2)).

2 New Zealand's first compulsion order

On 25 September 1996 Justice Sir Graham Speight ruled in the High Court at Auckland that a 21 year old Western Springs man had to give a blood sample to see whether he was involved in a vicious robbery in January 1996.[124] Police believe that the man took part in a robbery of the Bayou Cafe in Richmond Rd, East Lynn, in the early hours of Janury 14 1996. The man had previously refused to supply blood voluntarily for comparison with the blood found at the cafe. This was the first time that the Act has been used to compel a supect to provide a blood sample since it came into force on 12 August 1996.[125] On 17 October 1996 police made criminal history when they had to use force, sanctioned by the new legislation, to put the compulsion order into effect. The suspect had refused to cooperate. It is interesting to compare the experience of Victoria in Australia, where the police have not yet had to use force,[126] with the experience of New Zealand, where the very first compulsion order had to be carried out with the use of force!

3 Legislation in other countries

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124 "Taking Blood Sample Makes History" New Zealand Herald, Auckland, 18 October 1996, A3.

125 "Judge allows force in taking blood", New Zealand Herald, Auckland, 26 September 1996.

126 See below Part VI C 3.

Overseas precedents are mixed. In the United States authority to obtain blood samples is usually obtained by application for a search warrant or court order. In many state jurisdictions case law permits reasonable force to be used in the execution of such an order or warrant.[127]

In Australia the state of Victoria has since 1989 had legislation providing for the police to use reasonable force to obtain a blood sample if there is a refusal to comply with a court order.[128] The information received from Victoria is that on no occasion has the use of force been required to ensure compliance with a court order.[129] It is possible that other Australian States may adopt the Victorian model. A draft Model Bill for Forensic Procedures[130], which provides that reasonable force may be used to enable procedures such as the taking of a blood sample to be carried out, was recently released for public comment by the Australian Standing Committee of Attorneys-General.[131]

In the UK section 63 of the Police and Criminal Evidence Act 1984 (PACE) distinguishes between intimate and non-intimate samples and provides that intimate samples (which include a sample of blood) may only be taken with the consent of the person and that force may not be used to take such samples.[132] Section 63(10) makes provision for the drawing of an adverse inference at any subsequent criminal

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127 Department of Justice, *Briefing Paper to the Justice and Law Reform Committee*, 2 March 1995, 3.

128 Crimes (Blood Samples) Act 1989. See above n 25, 12.

129 Department of Justice, *Briefing Paper to the Justice and Law Reform Select Committee*, 13 April 1995, 2; cf New Zealand's first compulsion order, see Part VI C 2.

130 No timetable for consideration of the Model Bill has been set by the Standing Committee of Attorneys-General.

131 Above n 127, 3.

132 In Scotland the taking of samples from the body of a suspected or accused person is almost wholly based on common law. Where consent is refused, a warrant for the taking of a sample can be obtained from a sheriff. This is believed to achieve a satisfactory balance between the interests of the suspect and the interests of the public and the victim. See *HM Adv v Milford* 1973 SLT 12; see also Scottish Law Commission discussion paper no 80 *Evidence: Blood Group Test, DNA Tests and Related Matters*, December 1988.

proceeding in the event of a refusal, without good cause, to give an intimate sample. Under section 64, non-intimate samples may be taken without consent by the police (only after arrest), and reasonable force may be used to obtain such samples.[133]

Canada has no legislation authorising the taking of blood samples from suspects. This is because the Supreme Court of Canada has characterised the taking of a suspect's blood in the absence of full and informed consent as unreasonable search and seizure. This is due to the impact of section 8 of the Canadian Charter of Rights and Freedom.[134]

4 Arguments for and against the provisions

a) Abrogation of rights?

Seven submissions to the Select Committee commented on the application of the New Zealand Bill of Rights Act 1990. It was alleged that the provisions allowing compulsion orders and the use of force were inconsistent with various sections of the Bill of Rights Act 1990. Compliance with the following rights were queried:

Section 11 Right to refuse to undergo medical treatment.

Section 21 Unreasonable search and seizure.

Section 23 Rights of persons arrested or detained.

Section 25 Minimum standards of criminal procedure (especially subsection (d) The right not to be compelled to be a witness or to confess guilt).

b) The Department of Justice's reply

Upon the request of the Select Committee, the Department of Justice[135] commented on the submissions which queried the

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133 See also n 4, 37.

134 New Zealand Law Society, *Submission to the Justice and Law Reform Select Committee*, 9 March 1995, 3.

135 Above n 25, 7.

implications of the Bill of Rights Act 1990. The report pointed out that section 7 of the Bill of Rights Act requires the Attorney-General to bring to the attention of the House of Parliament any provision in any bill which appears to be inconsistent with the rights and freedoms contained in the Bill of Rights Act. The Crown Law Office assists the Attorney-General in his functions under section 7 by vetting Justice bills. A section 7 report was not made in the case of the Criminal Investigations (Blood Samples) Bill.[136] In assessing whether a bill is inconsistent with the Bill of Rights Act, the first stage is to determine whether any of its provisions prima facie breach a particular right or freedom. If there appears to be such a breach, section 5 is invoked, namely that the rights and freedoms in the Bill of Rights can be subject only to such "reasonable limits prescribed by law, as can be demonstrably justified in a free and democratic society". The test applied was outlined in *Ministry of Transport v Noort, Police v Curran*[137], and this approach shows that the rights and freedoms in the Bill of Rights Act are not absolute.

With regard to section 25(d), the Department of Justice pointed out that there was no prima facie breach because the right of an accused not to be compelled to testify against him or herself in criminal proceedings does not include the right to resist a lawful investigative power to obtain incriminating evidence.[138]

The Department of Justice expressed doubt as to whether the right contained in section 11 of the Bill of Rights Act was affected by the provisions of the bill because case law has not yet determined the issue of whether "medical treatment" is involved in the taking of a blood sample.[139]

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136 Above n 25, 6.

137 [1992] 3 NZLR 260.

138 Above n 25, 10. The courts in other countries have consistently refused to extend the right against self-incrimination to evidence obtained from body samples.

139 In *Cairns v James and Cox* (1992) NZFLR 353 the issue was raised but not decided.

Section 21 provides that "Everyone has the right to be secure against unreasonable search or seizure, whether of the person, property or correspondence or otherwise". In *R v Jefferies*[140] Richardson J stated the following: "Whether the intrusion is "unreasonable" involves weighing all relevant policy considerations and their applications in the particular case". It can therefore be argued that the intrusion may be reasonable and therefore not constitute a breach of section 21.

Section 23 protects the rights of persons arrested or detained. In *Police v Smith and Herewini*[141] Richardson J expressed doubt as to whether the submission to a blood sample being taken (under section 58D of the Transport Act 1962) constituted a detention. Section 23(5) provides that "everyone deprived of liberty shall be treated with humanity and with respect for the inherent dignity of the person". As the Criminal Investigations (Blood Samples) Act makes provision for the court to issue a warrant to detain a person until the blood sample is taken in accordance with a compulsion order, this would qualify as a "deprivation of liberty". However, such a person would be entitled to the protection in section 23 of the Bill of Rights Act.

If there is a prima facie breach of sections 11, 21 and 23 of the Act (and it can be argued that there is no such breach, as shown above), the question is whether the limitations can be justified under section 5. The State interests that must be weighed up against the privacy and dignity interests of individuals include the prosecution, detention and efficient investigation of crime. The Department of Justice also pointed out that the bill contained a number of features which ensured that the interference with an individual's rights was minimised.[142]

c) Alternative measures?

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140 [1994] 1 NZLR 290.

141 Unreported, 10 December 1993, Court of Appeal, CA 42/93, CA 109/93.

142 Above n 25, 9.

Several of the submissions opposing the use of force suggested alternative measures to the use of force. One option mentioned was the adverse inference which a court or jury can draw from a refusal to submit to the taking of a blood sample, as is the position in the UK.[143] Another option that was suggested was to create a specific offence for failing to provide a blood sample.[144]

Both the alternatives suggested for the use of force would defeat the purpose of the relevant provisions. The option of a specific offence would offer the suspect the easy choice of punishment for the lesser offence of non-compliance rather than taking the risk of imprisonment for the substantive offence.[145] The adverse inference option is inadequate because the sanction would only apply to those people who are subsequently charged with an offence despite there being no DNA evidence. It has not always been possible to proceed with an investigation or to trial without DNA evidence.[146]

d) The degree of intrusion

It has been argued that the taking of a blood sample, even by the fingerprick method, is more intrusive than the forcible taking of fingerprints. Dr Rodney Harrison, President of the Auckland Council for Civil Liberties, considers the use of physical force by agents of the state to extract evidence as "torture".[147] On the other hand, it can be argued that the fingerprick procedure is the lowest level

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143 Eg Doctors for Sexual Abuse Care, *Submission to the Justice and Law Reform Select Committee*, not dated, 2; Auckland District Law Society Public Issues Committee, *Submission to the Justice and Law Reform Select Committee*, 28 February 1995, 6.

144 Eg YWCA, *Submission to the Justice and Law Reform Select Committee*, not dated, 5; Auckland Council for Civil Liberties, *Submission to the Justice and Law Reform Select Committee*, 6 March 1995, 6.

145 Above n 113, 2 and 10.

146 Above n 25, 14.

147 R Harrison "DNA, The Modern Fingerprint. Commentary. What's Your Problem? It's Just a Prick" in FWM McElrea (ed) *Re-thinking Criminal Justice* vol II (Legal Research Foundation, 1995) 28. He likens the thumb prick by force to the medieval thumbscrew!

of intrusion possible[148] and ought to be able to be carried out with minimal force, minimal intrusion and minimal discomfort and humiliation to the suspect.[149] It has been compared to two other statutory provisions which provide the police with ways of determining identification, and also allow, if required, reasonable force to be used. These are section 57 of the Police Act 1958 and section 17 of the Penal Institutions Act 1954 which provide for the taking of photographs, fingerprints, palm prints and footprints.[150]

e) Refusal and serious offenders

The Department of Justice suggests that on the basis of current experience there is perhaps insufficient evidence to show that serious offenders in fact escape conviction because of a refusal to provide a blood sample. There may also only be a small number of cases where the police would have sufficient evidence to obtain a court order, but have insufficient evidence to lay charges if a suspect refused to comply with the order.[151]

The New Zealand Police, however, believe that the use of reasonable force is pivotal to the success of the legislation.[152] The reason is that without this provision it would be advantageous for an offender to neither consent to a police officer's request nor to comply with the Judge's order to give a blood sample. If the absence of DNA profiling means that there is insufficient evidence to support a charge, such an offender may even be able to avoid a trial. If there is sufficient evidence, the jury may do no more than draw an adverse

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148 Because venous samples have been ruled out. See n 25, 14.

149 Above 113, 10; 14

150 New Zealand Police Association, *Submission to the Justice and Law Reform Select Committee*, February 1995, 3.

151 Above n 25, 14.

152 New Zealand Police, *Report to the Justice and Law Reform Select Committee*, 1 June 1995, 1. However, in *R v Martin* (1991) 7 CRNZ 296 the court held that no inference may be drawn from an accused's refusal to provide a blood sample; it should be seen as an expression of his legal right to prevent interference with his personal liberty(!)

inference from the refusal to supply a blood sample.[153]

The following examples were put forward to illustrate how crucial DNA related evidence can be:

* In *R v Montella*,[154] in which a suspect was prosecuted for the sexual violation of a 12 year old boy, Williamson J refused to admit evidence obtained through DNA analysis on the grounds that the accused had only consented to a blood test for the purposes of AIDS testing but not for DNA analysis.[155]

* In *R v Pira*[156] a prosecution was only made possible because of the availability of DNA analysis. In the course of the investigation into a robbery and rape, a request for a blood sample was made of three suspects. Two provided a sample but Pira refused. More than a year later Pira agreed to provide a blood sample when he was involved in a car accident. The analysis that followed provided sufficient identification evidence to have Pira charged with aggravated robbery and rape. It might be mentioned that the circumstances in which Pira later agreed to provide a blood sample can only be described as extremely fortuitous. Without that blood sample there would have been no case.[157]

* Yet another example mentioned by the police [158] is a case where a woman was confronted by an intruder in her home and raped after her hands had been tied. The person suspected by the police was asked to provide a blood sample but refused on the advice of his solicitor. Although there is other

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153 Above 113, 2; 9.

154 (1991) 7 CRNZ 258.

155 New Zealand Police, above n 152, 1.

156 Unreported, 9 December 1992, Court of Appeal, CA 328/92.

157 Above n 152, 3.

158 Above n 152, 2.

> circumstantial evidence which points towards this suspect as having committed the offence, the police believe that in the absence of DNA profiling there is insufficient evidence to charge him. Facing the prospect of a long term of imprisonment, should DNA profiling confirm his identity, the suspect has no reason either to agree to giving a blood sample or to comply with a judicial order requiring him to give it.[159]

In the face of police evidence that serious offenders escape conviction because of their present right to refuse to provide a blood sample, it seems obvious that the ability to use reasonable force is the most effective way of ensuring that a sample is in fact obtained pursuant to a court order. It can also be argued that the ability to use force should act as a potent incentive for suspects to comply with a court order, in which case force will not have to be used.[160]

5 Public interest v the civil libertarian view

In spite of considerable opposition, the provisions allowing for compulsion orders and the reasonable use of force were included in the Criminal Investigations (Blood Samples) Act 1995. The civil libertarian view that "the traditional balance between citizen and the State is being manipulated in favour of the State, at the expense of privacy and bodily integrity"[161], was therefore not upheld and the view that favoured the public interest won the day. The latter view was reflected in a newspaper editorial at the time when the Act was passed, and included the following:

> Parliament considered the legislation long and hard, and has struck the right balance. It is only common sense to give police the ability to use what may prove to be the most significant advance in criminal investigative techniques since the advent of fingerprinting. Those who carp against it risk being seen as more concerned with protecting offenders than in delivering justice to

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159 Above n 113, 9.

160 See experience of Victoria, Australia, above Part VI, C 3.

161 Above n 121,4.

their past victims and protection to their future targets.[162]

D The Scope of the Databank

1 Primary object

The primary objective in establishing a databank of DNA profiles is to enable the police to match profiles obtained from body samples found at the crime scene with profiles in the databank, thereby having a good chance of identifying the offender concerned. There are, however, also secondary justifications.[163] It will assist in the early elimination of suspects whose profiles on the databank do not match the offender's. It may also act as a crime prevention tool. Knowing their DNA profile is on the databank may act as a significant deterrent preventing people from committing serious offences.

2 DNA profile databank

Part III of the Act makes provision for the taking of blood samples, either by consent or compulsion from certain convicted offenders, for a databank in which the DNA profiles of those persons will be stored for law enforcement purposes. The description "DNA Profile Databank" makes it clear that the database will contain only DNA profiles and not the genetic material from which they are derived.[164] The legislation is confined to the taking of blood samples, as the advice from the ESR is that blood remains the most suitable bodily material for DNA analysis. The Institute's advice is that in order to efficiently and accurately match a suspect's DNA profile with a body sample taken from a crime scene, it is necessary to have a blood sample of reasonable quantity from the suspect. Other body samples (such as hair or saliva) which might be obtained from a suspect are

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162 Editorial, The Dominion, 23 October 1995.

163 Above n 152, 2.

164 Above n 112, 25.

not considered as satisfactory substitutes for blood.[165]

Two categories of profiles may be stored on the databank: 1) any profile derived from a blood sample obtained by consent or compulsion under Part II where the suspect has been convicted of a relevant offence, being either the offence in respect of which the sample was taken or a "related" offence as defined in section 2(2); and 2) any profile derived from a blood sample taken by consent or compulsion under Part III. With regard to the second category there are two ways in which a blood sample may be obtained for the purposes of deriving DNA profiles for storage on the databank. Firstly the police may request any person aged 17 years or over to consent to giving a sample. In such a case the procedure is similar to that applicable to suspect requests under Part II, except that a databank request is not related to a specific offence and there need be no ground for suspecting that the person requested has been involved in the commission of any offence. Secondly, where any person of whatever age is convicted of a relevant offence, the police may apply, at the time of sentencing, or at any time within 6 months of conviction, for a "databank compulsion order" requiring the convicted person to give a blood sample.[166] Special provisions apply where databank compulsion orders are sought in relation to persons under the age of 17 years.

For the purposes of Part III of the Act, "relevant offence" includes not only the serious crimes listed in Part A of the Schedule, but also burglary and entering with intent which are separately specified in Part B. These two less serious offences were added because evidence was presented in committee that 94 per cent of persons convicted of intruder rape have previous convictions for burglary and/or entering with intent. Where a person's DNA profile is stored in the databank the profile is not admissible in evidence against

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165 This is so even with the new techniques, such as PCR, which allows more discrete analysis of smaller quantities of body material. See also n 127, 1-2.

166 On 27 November 1996 a databank compulsion order was made in the High Court in Auckland in respect of a 17 year old youth who is serving a four year sentence for aggravated robbery. This is probably the second order of its kind under the new Act as it is believed that the first order was in fact recently made in Whangarei.

that person in any criminal proceedings, except where the profile is derived from a blood sample taken from a suspect and the proceedings are for the offence in relation to which the sample was taken. This means that a DNA profile may be used for investigative purposes, but if a profile is to be used in a prosecution, a further blood sample will be required. A DNA profile may however be used in evidence in any application for a compulsion order.[167]

The Act recognises the right of any non-offender, by written notice to the Commissioner of Police, to withdraw his or her consent under Part III to the use of any blood sample for the purposes of obtaining a DNA profile. The Commissioner must then ensure that the sample and profile are destroyed as soon as practicable. As a further safeguard, the annual report of the police must also include the total number of DNA profiles stored on the databank for the period under review, together with a breakdown indicating whether the profiles were obtained by consent or compulsion order. Even so, the retention of non-offender DNA profiles is a matter that warrants continuing legislative invigilation.[168]

3 Recommendations by the Privacy Commissioner

Recommendations by the Privacy Commissioner[169] to the Justice and Law Reform Committee led to the limitation of access and disclosure of DNA profiles. Access to and disclosure of the profiles is confined to the following purposes: forensic comparison in the course of a police investigation, providing information in accordance with the Privacy Act 1993, and administering the databank. Additional safeguards have also been incorporated in the dual request provisions to meet another objection by the Privacy Commissioner. The police may make a databank request to a person in conjunction with a suspect request. To ensure that any person subject to a dual request understands that a sample is required for both investigative and

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167 Above n 25, 18.

168 Above n 112, 36.

169 *Submission to the Justice and Law Reform Committee*, 1995.

databank purposes, the police must observe the separate information and notice requirements that apply to the two procedures. In addition, the person requested must be specifically informed that she or he may consent to the taking of a blood sample in response to both requests or only one, or may refuse both.

The Act also enables the police to use the databank for scanning the profiles of any other persons who agree to provide a sample. The only criterium for inclusion is the person's consent. The Privacy Commissioner was concerned that a person who is willing to supply a sample for the purposes of a specific investigation, may, in the spirit of cooperation with the investigation, feel reluctant to or unable to refuse the other request for the profile to be in the databank. In cases where the police are conducting a large sweep (eg "Operation Park")[170] and a large number of people are being approached for elimination purposes, there is obviously the opportunity to gather a large number of samples from persons who are entirely innocent of offences.

4 Strict controls

Because DNA can be used for many more purposes than simple identification (eg determining a person's susceptibility to diseases, behavioural patterns etc), it has been argued that it is necessary to have comprehensive legislation to provide for both informed consent in the taking of samples and for tight restriction regarding the uses to which they are put. There is the fear that databanking by government without strict controls would allow the state unprecedented scope to pry into its citizens' lives.[171] Cameron Price comments that DNA based identification databanking intrudes into civil liberties. He points out that the initial limitations on access to the databank can be amended by a mere simple majority vote.

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170 Over 1,000 people voluntarily provided blood samples for DNA analysis.

171 ED Shapiro ML Weinberg "DNA Databanking: The Dangerous Erosion of Privacy" (1990) 38 Cleveland State LR 455, 479. See also PL Bereano "The Impact of DNA based Identification Systems on Civil Liberties" in R Billings *DNA on Trial*, 119. See al;so NL Wiler, S Stavski, R Lewontin, PR Billings "DNA Databanking and the Public Interest" in P R Billings (ed) *DNA on Trial* 141.

"Once a databank is established for a particular group such as sex offenders, what protection do we have against pressures to extend it yet to other groups such as insurers, employers, medical research institutes and other individuals or institutions who claim they have need to access the information?"[172] These fears are probably not justified considering that only DNA profiles, which can be used for little else than simple identification, will be stored and not the genetic material from which they are derived.

VII CONCLUSION

Since the discovery of DNA profiling in 1985 and the landmark case of *Pitchfork* in England in 1987, many violent crimes have been solved through the use of this powerful forensic tool. New Zealand has followed the developments overseas and embraced the use of DNA profiling in criminal investigations with confidence and enthusiasm. The enactment of the Criminal Investigations (Blood Samples) Act 1995 is a manifestation of this enthusiasm, and in providing for compulsion orders and the reasonable use of force, New Zealand has boldly taken the lead instead of waiting to follow legal developments in other countries.

Despite the benefits of DNA profiling one should still bear in mind the potential for grave injustice occurring if a critical approach is not adopted by both lawyers and forensic scientists. The dangers are summed up by Andrew Hall as follows: "The risk is that it [DNA profiling] becomes a black box into which the scientific evidence is placed at one end and the verdict in the criminal case is produced at the other".[173]

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172 CA Price "DNA, The Modern Fingerprint" in FWM McElrea (ed) *Re-Thinking Criminal Justice* vol II, 15.

173 Above n 88, 203.

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