HIGH COURT OF AUSTRALIA

FRENCH CJ,
HAYNE, HEYDON, CRENNAN AND BELL JJ

YUSUF AYTUGRUL APPELLANT

AND

THE QUEEN RESPONDENT

Aytugrul v The Queen [2012] HCA 15
18 April 2012
S315/2011

ORDER

Appeal dismissed.

On appeal from the Supreme Court of New South Wales

Representation

S J Odgers SC with K J Edwards for the appellant (instructed by Legal Aid Commission of NSW)

D U Arnott SC with V J Lydiard for the respondent (instructed by Solicitor for Public Prosecutions (NSW))

CATCHWORDS

Aytugrul v The Queen

Criminal law – Evidence – Admissibility of evidence about DNA analysis – Appellant convicted of murder – Expert gave evidence at trial about mitochondrial DNA testing of hair found on deceased's thumbnail – Expert's statistical evidence given in form of frequency ratio and exclusion percentage – Whether evidence of exclusion percentage relevant given evidence of frequency ratio – Whether probative value of evidence of exclusion percentage outweighed by danger of unfair prejudice to appellant – Whether evidence of exclusion percentage misleading or confusing.

Evidence – Judicial notice – Argument for general rule that evidence of exclusion percentage is always inadmissible due to danger of unfair prejudice – Facts underpinning adoption of general rule not proved – Whether judicial notice can be taken of psychological research said to support adoption of general rule.

Words and phrases – "evidence", "exclusion percentage", "frequency ratio", "judicial notice", "misleading or confusing", "unfair prejudice".

Evidence Act 1995 (NSW), ss 135, 137, 144.

1 FRENCH CJ, HAYNE, CRENNAN AND BELL JJ. The appellant was tried in the Supreme Court of New South Wales for murder. The deceased and the appellant had been in a relationship but that relationship had ended more than two years before the deceased was stabbed to death. The prosecution case at trial was circumstantial. The prosecution alleged that the motive for the killing came from the failure of the appellant's relationship with the deceased and her having formed a relationship with another man. In order to establish motive, the prosecution relied on evidence that about five months before the deceased was killed the appellant had published a poem in the *Turkish Weekly News* declaring that he could not give up his love for the deceased. (Both the appellant and the deceased were of Turkish origins.) The prosecution further relied on evidence which it was said showed that the appellant had stalked and harassed the deceased for some months before her death.

2 This appeal concerns the admissibility of some evidence led at trial about a DNA analysis. A hair found on the deceased's thumbnail had been subjected to mitochondrial DNA testing. The results of that testing showed two things: first, that the appellant could have been the donor of the hair and, second, how common the DNA profile found in the hair was in the community. This second aspect of the results was expressed in evidence both as a frequency ratio[1] and as an exclusion percentage. The expert who had conducted the test gave evidence to the effect that one in 1,600 people in the general population (which is to say the whole world) would be expected to share the DNA profile that was found in the hair (a frequency ratio) and that 99.9 per cent of people would not be expected to have a DNA profile matching that of the hair (an exclusion percentage).

3 It is alleged that the evidence the witness gave in the form of an exclusion percentage was not admissible.

4 The appellant appealed to the Court of Criminal Appeal against his conviction on grounds that included the ground that "a miscarriage of justice occurred because of the prejudicial way in which DNA evidence was expressed to the jury". The Court of Criminal Appeal, by majority (Simpson and Fullerton JJ, McClellan CJ at CL dissenting), dismissed[2] the appellant's appeal.

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1 Sometimes called a "random occurrence ratio" or a "frequency estimate".

2 *Aytugrul v The Queen* (2010) 205 A Crim R 157.

5 By special leave, the appellant now appeals to this Court alleging that the Court of Criminal Appeal should have held that the trial judge had erred "in admitting statistical evidence expressed in exclusion percentage terms". The appellant submitted, in effect, that s 137[3] of the *Evidence Act* 1995 (NSW) required exclusion of evidence which expressed the results of the DNA testing as an exclusion percentage and further submitted that, if that were not so, the only proper exercise of the general discretion to exclude evidence given by s 135[4] of the *Evidence Act* would have seen the evidence excluded.

6 The appellant did not demonstrate that the evidence given at the trial which expressed results of the DNA testing as an exclusion percentage was evidence the probative value of which was outweighed by the danger of unfair prejudice to the appellant. Neither s 137 nor s 135 of the *Evidence Act* was engaged. The appeal should be dismissed.

The impugned evidence and objection taken

7 The prosecution called two witnesses to give expert evidence about mitochondrial DNA analysis of the hair that had been found under the deceased's thumbnail. The defence called its own expert on the subject. All three witnesses agreed that the appellant could not be excluded as having been the donor of the hair that had been found, but their evidence differed as to the weight that could be given to this conclusion.

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3 Section 137 of the *Evidence Act* 1995 (NSW) provides:

> "In a criminal proceeding, the court must refuse to admit evidence adduced by the prosecutor if its probative value is outweighed by the danger of unfair prejudice to the defendant."

4 Section 135 provides that:

> "The court may refuse to admit evidence if its probative value is substantially outweighed by the danger that the evidence might:
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> (a) be unfairly prejudicial to a party, or
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> (b) be misleading or confusing, or
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> (c) cause or result in undue waste of time."

8 One of the two experts called by the prosecution, Ms Gina Pineda, Associate Laboratory Director and Technical Leader of a United States DNA laboratory company, had supplied a written report of the results of mitochondrial DNA testing by the company of the hair recovered from the deceased and its comparison with the results of testing of a sample of blood taken from the deceased and a sample of saliva taken from the appellant. The report expressed the conclusions that the deceased and all her maternal relatives were excluded as the donor of the hair but that the appellant and his maternal relatives were not excluded. Using a database that Ms Pineda later identified and described in her oral evidence, the report said that the mitochondrial DNA sequence identified in the hair sample had been observed "0 times[5] in 4839 individuals of various population groups (99.9% excluded)".

9 In the light of the report Ms Pineda had supplied, trial counsel for the appellant objected to reception of any of Ms Pineda's evidence other than her evidence that the appellant could not be excluded as the donor of the hair. As initially framed, the objection, though mentioning both ss 135 and 137 of the *Evidence Act*, was founded not on the point made in this Court but on a challenge to the sufficiency of the database relied on by Ms Pineda as a foundation for expressing her further opinions. After evidence was taken on the voir dire, trial counsel did accept, at one point in her submissions, that the witness could express the opinion that one in 1,600 persons could be expected to have the same DNA profile but objected to the witness expressing the same result as an exclusion percentage of 99.9 per cent "[b]ecause it has a connotation that is very different to the reality". But following an adjournment, trial counsel for the appellant pressed the larger and wider objection that the witness could give no evidence extrapolating from observing the DNA sequence once in a database of 4,839 individuals to frequency of occurrence (or exclusion percentage) in the general population because the database used by the witness as the foundation for her opinion was not shown to be a database that would yield relevant results. Only passing reference was made again to the witness giving evidence of an exclusion percentage, the chief thrust of the argument being that Ms Pineda should not be permitted to give evidence of either a frequency ratio of one in 1,600 or an exclusion percentage of 99.9 per cent.

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5 Ms Pineda accepted, in her oral evidence on the voir dire, that this was an error and that the results observed should be expressed as one time in 4,839 individuals of various population groups (99.9% excluded). Her oral evidence to the jury was to the same effect.

10 This being the state of argument about the admissibility of the evidence, it is unsurprising that the trial judge (R A Hulme AJ) delivered reasons which dealt only with the objection to reception of any evidence from Ms Pineda which extrapolated from the observations made by comparison with the database used to a frequency ratio of one in 1,600 or an exclusion percentage of 99.9 per cent. The trial judge overruled the objection holding, in effect, that the alleged insufficiency of the database relied on by Ms Pineda was not a basis for rejecting the evidence she would give of her opinions. No separate consideration was given by the trial judge to whether the opinions to be expressed by Ms Pineda could be given in the form of both a frequency of occurrence and an exclusion percentage. No separate consideration was given to the application of either s 135 or s 137 of the *Evidence Act*. And when Ms Pineda gave her evidence, she did so without further objection.

11 The appeal to this Court was argued on the footing that nothing turned on the way in which the arguments about admissibility were presented and resolved at trial. It is convenient to put aside those aspects of the matter and go at once to the evidence that the appellant submitted should not have been admitted. That is best done by setting out in full the answer which Ms Pineda gave to a question from the trial prosecutor: "Then having determined, as I understand it, that the profile found on the accused's saliva card and the profile found on the hair, occurs in one of the 4,839 people on the database, what did you then do?". Ms Pineda said:

> "We then applied what we call a 95 percent confidence interval, which is another tool that we can use in our statistical analysis to account for the size of the database. So, it is impossible to test the entire population of the world for mitochondrial DNA. So we have to make inferences from the databases that we do have. The question then becomes: what if we had a different database, what would the results be then?
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> This tool that we call a 95 percent confidence interval can give us an idea – an upper bound and a lower bound – a range. If we were to look at another database, the true frequency would fall in this range. When we performed this additional statistical analysis, we saw that applying the 95 [percent] confidence interval we can expect to see this profile most commonly; one in approximately 1,600 individuals. *So, what this means is if we were to take another database, we would expect to see this profile not more than one in 1,600 individuals. If you take that frequency of the profile and inverted it, another way of looking at it is to say we expect to see it most commonly in one in 1,600 people; how many people could not have contributed to this profile. That is what we call an exclusion probability and we give this a percentage, a percentage of the population*

> *who could not have contributed to this profile, based on the database we are using and that percentage came up as 99.9 percent of the population could not have this profile that we have encountered in this case.*" (emphasis added)

12 It will be observed that the witness gave both a frequency ratio (one in 1,600) and an exclusion percentage (99.9 per cent) and that she explained how the exclusion percentage was calculated.

13 Shortly after Ms Pineda had given the evidence just described, the Court adjourned for the day. When she resumed giving her evidence on the following day of hearing, the trial prosecutor returned to the subject of a "95 per cent confidence interval". Ms Pineda explained that "to account for the size of the database we apply this confidence interval that tells us basically 95 per cent of the time you're going to see this profile not more often than one in 1,600 individuals". She continued: "[T]hat is the upper limit of that range. So that is the most conservative value that we can give you which gives the most benefit to the accused. It's the most frequently that we can expect to see this profile in the separate database." She concluded her answer by saying: "The 99.9 per cent figure is just the inverse of that. One in 1,600 is the frequency of occurrence – the expected frequency. The 99.9 per cent is the percentage of the [population] who could not have contributed to that sequence. So it's the same information, just looking at it in two ways."

14 Trial counsel for the appellant did not cross-examine Ms Pineda about exclusion percentages. Trial counsel did, however, seek to give further content to the frequency ratio given by Ms Pineda by putting to Ms Pineda an example based on a group of 16,000 people attending a football match. Trial counsel put to Ms Pineda that "on one day, with 16,000 people in the football stadium, you might have 100 people with the same mitochondrial DNA as Mr Aytugrul", to which Ms Pineda replied, "And on other days you might have none." Asked: "So, is it an average?", Ms Pineda replied: "Yes".

15 The expert about DNA analysis called by the defence at trial (Dr John Buckleton, a scientist employed by the New Zealand Government) expressed the opinion that the DNA profile found in the hair taken from the deceased's thumbnail might be found in one in 1,000 people in the non-Turkish population and between one in 50 and one in 100 or 200 people in the Turkish population. In the course of Dr Buckleton's evidence the trial judge referred Dr Buckleton to Ms Pineda's evidence that the frequency ratio she had given (one in 1,600) could be expressed as an exclusion percentage. As recorded in the transcript, there appears to have been some confusion about the number that Ms Pineda was said to have given as the exclusion percentage, reference being made to 99.5 per cent,

99.95 per cent and 99.99 per cent, whereas in her evidence Ms Pineda had rounded the exclusion percentage to one decimal place and stated it as 99.9 per cent. The trial judge put to Dr Buckleton that the difference between him and Ms Pineda was that "she's saying 99.95 and you're saying it should be more like 99.9, just on this mathematical exercise you're referring to". Dr Buckleton responded: "I consider the arguments regarding sampling and certainty to be marked with a lesser of the two evils. *So in fact the difference, as you pointed out, is quite minimal.*" (emphasis added)

16 In his directions to the jury, the trial judge said:

> "You have the opinion of Ms Pineda that, by reference to [an identified] database, she concluded this profile could be expected in 1 in 1600 people. *Putting it in another way, 99.99% of the population could be excluded as possibly having this profile.* …
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> When you are considering the evidence of [the] experts, you should bear in mind that none of them are saying that the hair found on [the deceased's] right thumb is in fact the accused's. None of them are saying that the mitochondrial DNA profile found in the hair establishes that it definitely came from him. ...
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> You then have evidence about the statistical probability of finding the same profile in other people in the population. At one end, you have Ms Pineda's evidence that such a profile can be expected to be found in 1 in 1600 people or, looking at it from the reverse perspective, you would not expect it in 99.99% of people. At the other end you have the evidence of Dr Buckleton that among Turkish people you would expect to find the profile in something between 1 in 50 and 1 in 100 people or less, and the evidence of Professor Balding [the other expert called by the prosecution] that you would expect it in 1 in 50 or less.
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> Looking at their evidence in the reverse way, they are in effect saying you would not expect to find it in at least 98% of Turkish people. Of course, the less likely the expectation of finding the same profile in other people in the population, the more value the evidence has in establishing the probability that the hair came from the accused." (emphasis added)

(As was noted in the Court of Criminal Appeal[6], it was not correct to describe Ms Pineda's exclusion percentage as 99.99 per cent but neither in the Court of

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6 (2010) 205 A Crim R 157 at 168 [62].

Criminal Appeal nor in the appeal to this Court was anything said to turn on this error.)

The Court of Criminal Appeal

17 In his dissenting reasons, McClellan CJ at CL treated the ground of appeal pleaded by the appellant (that a miscarriage of justice had occurred because of the prejudicial way in which DNA evidence was expressed to the jury) as raising a particular instance of a more general issue identified as the "intelligibility"[7] of DNA evidence or "juror comprehension of statistical evidence"[8]. McClellan CJ at CL made reference[9] to a number of published articles examining "the differing persuasive power of probabilistic formulations". Based on these writings, his Honour concluded[10] that "certain forms of expressing [DNA] statistics carry greater persuasive potential than others". It is neither necessary nor appropriate to consider whether what is said in those articles supports that conclusion, at least in a case where more than one form of expressing the statistics is adopted and the relationship between the expressions explained. In his Honour's opinion, the exclusion percentages given in evidence "all … invited a subconscious 'rounding up' to 100"[11]. Because of this "subliminal impact"[12], "[t]he exclusion percentage figures were too compelling"[13] which amounted to prejudice that was said[14] to substantially outweigh the probative value of the evidence. Reference was made to earlier decisions of the Court of Criminal Appeal (*R v GK*[15] and *JCG*[16]) where there had been consideration of whether use of percentage figures very close to

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7 (2010) 205 A Crim R 157 at 176 [101].

8 (2010) 205 A Crim R 157 at 177 [102].

9 (2010) 205 A Crim R 157 at 174 [89].

10 (2010) 205 A Crim R 157 at 176 [97].

11 (2010) 205 A Crim R 157 at 176 [99].

12 (2010) 205 A Crim R 157 at 176 [98].

13 (2010) 205 A Crim R 157 at 176 [99].

14 (2010) 205 A Crim R 157 at 176 [99].

15 (2001) 53 NSWLR 317.

16 (2001) 127 A Crim R 493.

100 was likely to be prejudicial or misleading. McClellan CJ at CL would have allowed the appeal and ordered a new trial; his Honour would not have applied the proviso[17] because "the exclusion percentages had the potential to overwhelm the jury"[18].

18 Simpson J, with whose reasons Fullerton J agreed[19] in this respect, accepted[20] that some formulations of the conclusions to be drawn from DNA testing "are likely to have greater impact than others", in the sense that "some formulations have a greater educative force or persuasive appeal than others; or … are more colourful, or more easily comprehended, than others". But Simpson J further concluded[21]: "Provided that what is contained in the formulations is accurate, I see no reason to prefer one method of expression over another." On the contrary, Simpson J held[22] that it is "beneficial (provided that, in translating one formulation to another, accuracy is not sacrificed) for the conclusions drawn [from DNA testing] to be expressed in ways that can readily be comprehended by juries" and held[23] that there was no reason "why a jury ought not to be assisted by having the evidence couched in the language most likely to be meaningful to lay recipients". Simpson J saw nothing which suggested "that the [DNA] evidence before the jury, framed as it was, was unduly or unfairly prejudicial, or confusing or misleading such as to raise for consideration either s 135 or s 137"[24] and concluded that there was no "deficiency in the way in which the jury was directed in relation to the DNA

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17 *Criminal Appeal Act* 1912 (NSW), s 6(1).

18 (2010) 205 A Crim R 157 at 181 [121].

19 (2010) 205 A Crim R 157 at 196 [238].

20 (2010) 205 A Crim R 157 at 186-187 [164].

21 (2010) 205 A Crim R 157 at 187 [164].

22 (2010) 205 A Crim R 157 at 187 [166].

23 (2010) 205 A Crim R 157 at 187 [170].

24 (2010) 205 A Crim R 157 at 192 [198].

evidence"[25]. Her Honour thus rejected[26] the ground of the appellant's appeal about presentation of DNA evidence.

The issue to be determined

19 Although the ground of appeal advanced by the appellant in the Court of Criminal Appeal was cast in terms of miscarriage of justice, the central complaint that the appellant made (both in the Court of Criminal Appeal and on appeal to this Court) was that evidence had been wrongly received and that there had been, in that respect, "the wrong decision of [a] question of law"[27]. Argument in the Court of Criminal Appeal appears[28] to have proceeded on the footing that that Court was being asked to establish, as a general legal proposition, that evidence expressing the results of DNA analysis as an exclusion percentage would in every case be inadmissible because its probative value is always outweighed by the danger of unfair prejudice to the defendant. In this Court the appellant urged that, despite both the infrequent mention made at trial of exclusion percentages and the close juxtaposition of that evidence with clear explanations of how exclusion percentages are calculated, Ms Pineda should not have been permitted to give the evidence she did that (a) pointed out that a frequency ratio of one in 1,600 entails that 1,599 of the 1,600 would *not* be expected to have the relevant DNA profile and (b) expressed that result as a percentage.

A general rule?

20 No sufficient foundation was laid, at trial or on appeal (whether to the Court of Criminal Appeal or this Court) for the creation or application of a general rule of the kind described. It may readily be accepted that, as McClellan CJ at CL demonstrated[29], research has been undertaken into whether some "forms of expressing [DNA] statistics carry greater persuasive potential than others". It is evident that numerous articles have been published in well-respected journals setting out the opinions of authors who have undertaken study of and experiments in relation to questions of this kind. But it is important

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25 (2010) 205 A Crim R 157 at 192 [199].

26 (2010) 205 A Crim R 157 at 192 [200].

27 *Criminal Appeal Act*, s 6(1).

28 See (2010) 205 A Crim R 157 at 169 [63], 173 [85], 176 [99], 191 [196].

29 (2010) 205 A Crim R 157 at 176 [97].

to recognise that the relevant field of study is not the law but psychology. And it was not demonstrated (whether at trial, in the Court of Criminal Appeal or on appeal to this Court) that the methods used in the studies that have been made, or the results expressed in the articles to which reference was made, are methods or results that have attained such a degree of general acceptance by those skilled in the relevant disciplines as would permit a court to take judicial notice of some general proposition about human understanding or behaviour said to be revealed by the published literature.

21 Before a court could take judicial notice of such a general proposition, the provisions of s 144 of the *Evidence Act*[30] would have to be met. As the majority of this Court noted in *Gattellaro v Westpac Banking Corporation*[31], "[i]n New South Wales there would appear to be no room for the operation of the common law doctrine of judicial notice, strictly so called, since the enactment of the *Evidence Act* 1995 (NSW), s 144". In this case, knowledge of the proposition in question could not be said to be "not reasonably open to question" and "common

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30 Section 144 provides that:

> "(1) Proof is not required about knowledge that is not reasonably open to question and is:
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> (a) common knowledge in the locality in which the proceeding is being held or generally, or
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> (b) capable of verification by reference to a document the authority of which cannot reasonably be questioned.
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> (2) The judge may acquire knowledge of that kind in any way the judge thinks fit.
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> (3) The court (including, if there is a jury, the jury) is to take knowledge of that kind into account.
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> (4) The judge is to give a party such opportunity to make submissions, and to refer to relevant information, relating to the acquiring or taking into account of knowledge of that kind as is necessary to ensure that the party is not unfairly prejudiced."

31 (2004) 78 ALJR 394 at 397-398 [17] per Gleeson CJ, McHugh, Hayne and Heydon JJ (Kirby J agreeing on this point at 405 [69]); 204 ALR 258 at 262, 272; [2004] HCA 6.

knowledge" or "capable of verification by reference to a document the authority of which cannot reasonably be questioned". And whether, in accordance with s 144(4), a sufficient opportunity was given to the parties to make submissions and to refer to relevant information such as was necessary to ensure that neither party was unfairly prejudiced by the court acquiring or taking into account "knowledge" of this kind need not be decided.

22 No proof was attempted, whether at trial or on appeal, of the facts and opinions which were put forward (by reference to the published articles) as underpinning the adoption of some general rule that expressing the results of DNA analysis as an exclusion percentage will always (or usually) convey more to a hearer than the evidence allows regardless of what other evidence is given about frequency ratios or the derivation of exclusion percentages. Yet that was the basis on which it was asserted that a general rule should be established to the effect that evidence of exclusion percentages is *always* inadmissible. And absent the proof of such facts and opinions (with the provision of a sufficient opportunity for the opposite party to attempt to controvert, both by evidence and argument, the propositions being advanced) a court cannot adopt such a general rule based only on the court's own researches suggesting the existence of a body of skilled opinion that would support it.

23 The question that was presented for consideration in this matter must be identified with greater specificity than is permitted by general reference to how the human mind can or commonly will deal with statistical information. In this case, the question was whether Ms Pineda's evidence of an exclusion percentage accompanied by both reference to the relevant frequency ratio and an explanation of how the exclusion percentage was derived from the frequency ratio was evidence whose probative value was outweighed by the danger of unfair prejudice (s 137) or was evidence whose probative value was substantially outweighed by the danger that it might be unfairly prejudicial to the defendant or, perhaps, be misleading or confusing (s 135).

24 No reason is shown for answering either form of those more particular questions in favour of the appellant. The evidence given was clear. It was evidence adverse to the appellant but it was in no sense *unfairly* prejudicial, or misleading or confusing. The exclusion percentage given was high – 99.9 per cent – but relevant content was given to that figure by the frequency ratios that were stated in evidence. As the trial judge pointed out to the jury, the evidence that was given did not, and was not said to, establish that the mitochondrial DNA profile found in the hair definitely came from the appellant. There was no risk of rounding the figure of 99.9 per cent to the certainty of 100 per cent.

25 The appellant also placed emphasis on evidence of the frequency ratios for a different reason. The appellant submitted that, if evidence was given in the form of frequency ratios, the exclusion percentage was evidence that "could not add anything of substance to" the frequency ratio or "could not, in any significant way, rationally add anything to the jury's assessment of the probability of the appellant's guilt". That is, so the submission ran, the "incremental probative value" of the exclusion percentage was "minimal". It was said that the proper application of ss 135 and 137 "would require exclusion if there was *any* risk of the jury giving more weight to the [exclusion] percentage evidence than it deserved" (emphasis in original).

26 These submissions, too, should be rejected.

27 This aspect of the appellant's submissions proceeded from an understanding of the term "evidence" that sought to apply both s 137 and s 135 on the footing that "evidence" about frequency ratios would be different and distinct from "evidence" about exclusion percentages[32]. Given the mathematical equivalence of the two statements, there may be some doubt about the validity of approaching the application of the two sections on the basis that there were two distinct pieces of evidence in issue. There is no need, however, to resolve this question.

28 The appellant accepted that the evidence about exclusion percentages was relevant – that is, that it was evidence that could rationally affect (directly or indirectly) the assessment of the probability of the existence of a fact in issue[33]. The appellant's submissions thus accepted that evidence expressed in the form of an exclusion percentage had, of itself, *some* probative value. And given that the exclusion percentage and the frequency ratio were no more than different ways of expressing the one statistical statement, the probative value of the exclusion percentage was necessarily *the same* as that of the frequency ratio.

29 The appellant's submission amounted in substance to an assertion that regard should be had to other evidence (the frequency ratio) in assessing the probative weight of the exclusion percentage but that regard could *not* be had to that other evidence when assessing the danger of unfair prejudice. There is no reason to approach the inquiry in this unbalanced way.

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32 cf (2010) 205 A Crim R 157 at 188 [173]-[175] per Simpson J.

33 *Evidence Act*, s 55(1).

30 The unfair prejudice said to arise in this case was alleged to flow from the use of a percentage figure, which carried a "residual risk of unfairness deriving from the subliminal impact of the raw percentage figures"[34] by way of rounding up the percentage figure to 100. If the exclusion percentage were to be examined in isolation, the appellant's arguments appear to take on some force. But to carry out the relevant inquiry in that way would be erroneous. In this case, both the frequency ratio and the manner in which the exclusion percentage had been derived from the frequency ratio were to be explained in evidence to the jury. The risk of unfair prejudice – described by the appellant as the jury giving the exclusion percentage "more weight … than it deserved" – was all but eliminated by the explanation. It is not right, as the submissions of the appellant implicitly urged, and as appears to have been the approach taken in *R v GK*[35], to assess the danger of unfair prejudice by reference *only* to the exclusion percentage, ignoring all other evidence. In assessing the danger of unfair prejudice to a defendant, regard must be had to the whole of the evidence that is to be given, particularly by the witness to whose evidence objection is taken. When that is done in this case, recognising, in particular, the evidence that it was proposed to lead from the witness about the derivation of the exclusion percentage, there was no danger of unfair prejudice that required rejection of the exclusion percentage.

31 At one point in oral argument, counsel for the appellant did suggest that there was a danger that the evidence of the exclusion percentage might "be misleading or confusing"[36]. Given the context of evidence of the frequency ratio and how the exclusion percentage was calculated, there was no danger that the evidence of the exclusion percentage might be misleading or confusing. The appellant did not demonstrate that the proper exercise of the discretion given by s 135(b) required rejection of the evidence of exclusion percentage.

32 There may be cases where evidence given of exclusion percentages may warrant close consideration of the application of s 135 or s 137 (or, where applicable, equivalent common law doctrines or statutory provisions). These reasons are not to be read as suggesting to the contrary. Evidence given about the results of DNA analysis is evidence about comparisons between identified

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34 *R v GK* (2001) 53 NSWLR 317 at 341 [100] per Sully J.

35 (2001) 53 NSWLR 317 at 331 [59]-[60] per Mason P (Dowd J agreeing at 342 [103]), 341 [98]-[100] per Sully J. See also *JCG* (2001) 127 A Crim R 493 at 507 [72]-[73] per Spigelman CJ (Sully and Adams JJ agreeing).

36 *Evidence Act*, s 135(b).

samples and one or more databases. The results of those comparisons can be expressed qualitatively or quantitatively. If expressed quantitatively there are assumptions and approximations made which often (perhaps always) require elucidation and explanation to make plain what are the limits to the opinion that is being expressed as a number or range of numbers. Just as evidence of an opinion given by an expert must, in order to satisfy the requirements of admissibility in s 79(1) of the *Evidence Act*, be "presented in a form which makes it possible to answer" the question posed by that provision[37], it will usually be important, even necessary, that the evidence provides the jury with so much of the expert's "specialised knowledge" as the jury requires properly to understand the opinion expressed – and what it can and cannot demonstrate – and that this specialised knowledge be related to the facts of the case[38].

33 It may very well be right to observe that a frequency ratio of one in 1,000 can, even may often, convey a different message to the hearer than does an exclusion percentage of 99.9 per cent, because the denominator of the frequency ratio directs the hearer's attention to the population that must be considered when seeking to apply the ratio. (Of course, a percentage, too, is a ratio but may direct less attention to the denominator.) Not only that, it is important to recognise that evidence of DNA analysis tendered by the prosecution is tendered in proof of a case that the accused is guilty of the offence charged. It is not usually tendered only to *exclude* the possibility that there may be others who committed the offence (unless the possible class of offenders is limited). It is usually tendered to show that there is at most a small pool of persons, including the accused, who could have left a trace at the scene of the crime. But demonstrating that there are many persons in Australia who did *not* commit the crime charged against the accused may be thought, if that information is considered in isolation, to tend to distract attention from whether the accused is the one out of the remaining number of possible perpetrators who did commit the crime.

34 In this case, where both the frequency ratio and the exclusion percentage were given, and the relationship of one to the other was explained, there was neither a wrong decision of any question of law nor on any other ground a miscarriage of justice.

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37 *HG v The Queen* (1999) 197 CLR 414 at 427 [39] per Gleeson CJ; [1999] HCA 2; *Dasreef Pty Ltd v Hawchar* (2011) 85 ALJR 694 at 705 [36]; 277 ALR 611 at 621; [2011] HCA 21.

38 cf *Alford v Magee* (1952) 85 CLR 437 at 466; [1952] HCA 3.

35 The appeal to this Court should be dismissed.

36 HEYDON J. Gina Pineda gave evidence that the appellant had a particular DNA profile (a "mitochondrial haplotype"). She also gave evidence that the same mitochondrial haplotype was detected in a hair found under a nail of the deceased when she was discovered in her new apartment, which the appellant was said never to have visited. And she gave evidence that one in 1600 persons could be expected to have the same mitochondrial haplotype as was detected in that hair. The appellant called this a "random occurrence ratio" or a "frequency estimate". It expresses the frequency with which the profile can be expected to occur in the general population. The appellant did not deny, at least in the Court of Criminal Appeal and in this Court, that that evidence was admissible.

37 Gina Pineda also gave evidence of what the appellant called an "exclusion percentage". That percentage represents the proportion of the population who would not be expected to share the mitochondrial haplotype. The percentage she gave was 99.9%. As the appellant accepted, that is mathematically the same as the one in 1600 figure. It follows from the frequency estimate of one in 1600 people that 1599 of the 1600 people would not be expected to share the mitochondrial haplotype. That figure, expressed as a percentage, is approximately 99.9%. The appellant contends, however, that the trial judge failed in his duty to refuse to admit the evidence, since its probative value was outweighed by the danger of unfair prejudice to the appellant. For that submission, the appellant relied on s 137 of the *Evidence Act* 1995 (NSW) ("the Act")[39]. The appellant also contended that even if there were no unfair prejudice, the trial judge ought to have refused to admit the evidence since its probative value was substantially outweighed by the danger that the evidence might be misleading or confusing. For this alternative submission, the appellant relied on s 135(b) of the Act[40].

Preliminary matters

38 The appellant noted that s 137 creates a duty by using the word "must". He also noted that although s 190 of the Act permits the court, with the consent of the parties, to dispense with the application of various provisions of the Act, the provisions of Pt 3.11, in which s 137 (and s 135) appear, are not among them. This has significance, since s 190(2) creates some important limitations on a defendant's capacity to consent:

> "In a criminal proceeding, a defendant's consent is not effective for the purposes of subsection (1) unless:

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39 See above at [5] n 3.

40 See above at [5] n 4.

(a) the defendant has been advised to do so by his or her Australian legal practitioner or legal counsel, or

(b) the court is satisfied that the defendant understands the consequences of giving the consent."

39 Hence s 190(2) prevents any doctrine of implied waiver from applying. However, there is authority that under the Act otherwise inadmissible evidence is admissible if it was not objected to at trial[41]. And there is some, though not unanimous, authority on s 137 itself to the effect that the phrase "must refuse to admit evidence" in s 137 means "must refuse to admit evidence, if objected to"[42]. In this case, the evidence was objected to, in part on the ground the appellant now advocates.

"Probative value": the argument

40 The expression "probative value" appears in both ss 135 and 137. It is defined in the Dictionary, Pt 1, thus: "**probative value** of evidence means the extent to which the evidence could rationally affect the assessment of the probability of the existence of a fact in issue." Those words correspond closely with s 55(1) of the Act. It provides:

> "The evidence that is relevant in a proceeding is evidence that, if it were accepted, could rationally affect (directly or indirectly) the assessment of the probability of the existence of a fact in issue in the proceeding."

41 The appellant submitted that when applying ss 135 and 137 the court should assess the probative value of a particular item of evidence in the light of other evidence that has been or will be admitted in the trial. A particular item of evidence may have minimal probative value because it adds very little to the other evidence. In the present case, it was said that the exclusion percentage evidence could rationally have a minimal effect only on the assessment of the probability of the existence of a fact in issue because it added "virtually nothing, if anything", to the other evidence.

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41 *Dhanhoa v The Queen* (2003) 217 CLR 1 at 8-9 [18]-[22]; [2003] HCA 40. See also *Seltsam Pty Ltd v McGuiness* (2000) 49 NSWLR 262 at 287 [149]; *R v Kaddour* (2005) 156 A Crim R 11 at 26 [62]; *Gonzales v The Queen* (2007) 178 A Crim R 232 at 243-244 [24].

42 *R v FDP* (2009) 74 NSWLR 645 at 649-653 [16]-[30]; cf *R v Le* (2002) 130 A Crim R 44 at 65 [47].

42 In this Court the appellant cited no authority on the Act which upheld the appellant's argument after a contest[43]. The appellant did not put his argument to the trial judge or to the Court of Criminal Appeal, being represented there by different counsel. It was therefore inappropriate for the appellant to criticise the Court of Criminal Appeal majority for failing to adopt the reasoning underlying his argument. The argument is, however, an extremely interesting one. If correct, it could cause ss 135 and 137 to have a radical effect on the conduct of trials.

"Probative value": *Old Chief v United States*

43 The appellant claimed support for the argument in *Old Chief v United States*[44]. In that case the accused was charged with illegal possession of firearms. The Supreme Court of the United States held, by majority, that evidence of a prior conviction for assault causing serious bodily injury should have been excluded. In the majority's view, the evidence fell within the terms of the Federal Rules of Evidence, r 403[45]. The majority said that its "probative value [was] substantially outweighed by the danger of unfair prejudice". At the trial the accused had indicated preparedness to concede that he had "been convicted of a crime punishable by imprisonment exceeding one (1) year"[46]. The opinion of the Court was delivered by Souter J, in which Stevens, Kennedy, Ginsburg and Breyer JJ joined. That majority held that the fact which the accused wished to concede was relevant because the accused was charged with contravening 18 USC §922(g)(1). That provision made it unlawful for anyone "who has been convicted in any court of … a crime punishable by imprisonment for a term exceeding one year" to "possess in or affecting commerce, any firearm". The

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43 The appellant relied on *R v Taylor* [2003] NSWCCA 194. At [129] it is recorded that counsel implicitly conceded that it was open to the trial judge to have regard to the availability of one piece of evidence in concluding that the probative value of other evidence tendered was outweighed by the danger that its admission might result in undue waste of time. Thus the Court of Criminal Appeal in that case does not seem to have had the benefit of argument concerning the construction of the Act now advanced by the appellant.

44 519 US 172 (1997).

45 It provided:

> "Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence."

46 519 US 172 at 175 (1997).

majority also accepted that the name and nature of the accused's prior offences contained in the official record of his prior conviction were relevant. Those matters made it more probable that the accused's status was that described in §922(g)(1). But the majority considered it wrong to examine the probative value of the evidence tendered in isolation[47]. The evidence tendered – the official record of the conviction – added nothing to the evidentiary significance of the concession the accused was prepared to make[48]. The probative value of the evidence tendered had to be "discounted" for that reason[49]. Hence the danger of unfair prejudice in the evidence tendered substantially outweighed its "discounted" probative value.

44 Rule 403 corresponds substantially with s 135(a), not s 137. However, the appellant relied on *Old Chief v United States* as an authority casting light on what is meant by the expression "probative value", as it appears in both ss 135 and 137. The majority opinion in *Old Chief v United States*, in a passage which the appellant relied on, considered that there were two possible constructions of the provision. The first was as follows[50]:

> "An item of evidence might be viewed as an island, with estimates of its own probative value and unfairly prejudicial risk the sole reference points in deciding whether the danger substantially outweighs the value and whether the evidence ought to be excluded."

The second was described thus[51]:

> "Or the question of admissibility might be seen as inviting further comparisons to take account of the full evidentiary context of the case as the court understands it when the ruling must be made."

The majority continued[52]:

> "This second approach would start out like the first but be ready to go further. On objection, the court would decide whether a particular item of

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47 519 US 172 at 178-185 (1997).

48 519 US 172 at 186 (1997).

49 519 US 172 at 183 (1997).

50 519 US 172 at 182 (1997).

51 519 US 172 at 182 (1997).

52 519 US 172 at 182-183 (1997).

> evidence raised a danger of unfair prejudice. If it did, the judge would go on to evaluate the degrees of probative value and unfair prejudice not only for the item in question but for any actually available substitutes as well. If an alternative were found to have substantially the same or greater probative value but a lower danger of unfair prejudice, sound judicial discretion would discount the value of the item first offered and exclude it if its discounted probative value were substantially outweighed by unfairly prejudicial risk. … [T]he judge would have to make these calculations with an appreciation of the offering party's need for evidentiary richness and narrative integrity in presenting a case, and the mere fact that two pieces of evidence might go to the same point would not, of course, necessarily mean that only one of them might come in. It would only mean that a judge applying Rule 403 could reasonably apply some discount to the probative value of an item of evidence when faced with less risky alternative proof going to the same point."

The majority opinion approved the view that the phrase "probative value" in r 403 signifies the "marginal probative value" of the evidence relative to the other evidence in the case[53].

45 O'Connor J, with whom Rehnquist CJ, Scalia and Thomas JJ joined, dissented for various reasons, but did not refer directly to the reasoning in the passage just quoted.

46 The following matters may be noted in relation to the majority opinion.

47 First, it was supported by travaux préparatoires in the form of the 1972 Advisory Committee Notes on rr 401 and 403. There is no equivalent support in relation to ss 135 and 137. The doctrine stated in *Old Chief v United States* is not referred to in the relevant parts of the Australian Law Reform Commission Reports which led to the enactment of the Act and of ss 135 and 137 in particular[54]. Indeed, to some extent they point against the doctrine in *Old Chief v United States*. The Commission wrote of the clause in its proposed Bill which became s 135: "The clause reflects considerations which, at the present time, are

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53 519 US 172 at 185 (1997).

54 Australian Law Reform Commission, *Evidence*, Report No 26, (1985), vol 1 at 351-352 [643]-[644] and 529 [957] (the latter a passage specifically referred to by the appellant), and vol 2 at 290 [259]; Australian Law Reform Commission, *Evidence*, Report No 38, (1987) at 243 [315]-[319].

taken into account by courts in asking whether evidence is 'relevant'."[55] It is clear that at common law (and indeed under s 55(1) of the Act), evidence is not excluded as irrelevant merely because other evidence to the same effect has already been or will be admitted.

48 Secondly, the majority opinion in *Old Chief v United States* considered that the view it rejected was "open to a very telling objection". It was formulated thus[56]:

> "That reading would leave the party offering evidence with the option to structure a trial in whatever way would produce the maximum unfair prejudice consistent with relevance. He could choose the available alternative carrying the greatest threat of improper influence, despite the availability of less prejudicial but equally probative evidence."

A sound conclusion about the existence of a legal rule can be arrived at even though the arguments advanced for it are feeble. However, in relation to Australian law, this is a feeble argument, not a very telling one. It was not one on which the appellant in this Court relied. The method of statutory construction it employs is not legitimate. Of course it is legitimate to reject one possible construction on the ground that it would produce a very undesirable result in certain circumstances. But it is not legitimate to do so where those circumstances are very unlikely[57]. The ethical obligations of those who act as prosecutors, and even of those who act as advocates in civil cases, make the outcomes postulated by the majority opinion very unlikely in Australia.

49 Thirdly, the doctrine propounded in the majority opinion in truth appears to be quite narrow. That is because the majority opinion accepted "that the prosecution is entitled to prove its case by evidence of its own choice, or, more exactly, that a criminal defendant may not … admit his way out of the full evidentiary force of the case as the Government chooses to present it."[58] The majority gave very detailed and convincing justifications for this rule[59]. Those

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55 Australian Law Reform Commission, *Evidence*, Report No 38, (1987) at 243 [316]. See also Australian Law Reform Commission, *Evidence*, Report No 26, vol 1 at 350 [639].

56 519 US 172 at 183 (1997).

57 See the authorities on equivalent principles applying to constitutional validity set out in *Wainohu v New South Wales* (2011) 243 CLR 181 at 240-241 [151]-[152]; [2011] HCA 24.

58 519 US 172 at 186-187 (1997).

59 519 US 172 at 187-189 (1997).

justifications turn on the idea that "the prosecution with its burden of persuasion needs evidentiary depth to tell a continuous story"[60]. Indeed, the majority only upheld the accused's argument on the ground that that idea has "virtually no application when the point at issue is a defendant's legal status, dependent on some judgment rendered wholly independently of the concrete events of later criminal behavior charged against him."[61] That reasoning does not give much freedom for accused persons to invoke *Old Chief v United States* in support of an extensive exclusion of evidence. In *United States v Jandreau* the 8th Circuit Court of Appeals said[62]:

> "The *Old Chief* exception to the general rule is a narrow one. [The appellant] is unable to direct us to any case that has expanded it beyond cases dealing with prior convictions, and we decline to do so here."

50 Fourthly, the procedural background in the United States differs from that in Australia. In Australia, it is not difficult to make formal admissions in criminal cases[63]. The Australian statutes provide that once the defence make a formal admission of a matter of fact it is not necessary for the prosecution to call further evidence on that matter of fact. The majority view is that not only is it not necessary for the prosecution to do so, it is not even possible[64]. That does not seem to be the position in the United States. There, the "Government must prove every element of the offense charged beyond reasonable doubt, … and the defendant's strategic decision to 'agree' that the Government need not prove an element cannot relieve the Government of its burden".[65] It follows that if the doctrine in *Old Chief v United States* applied to the Act, it might have a very radical effect on the conduct of litigation in general and criminal litigation in particular.

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60 519 US 172 at 190 (1997).

61 519 US 172 at 190 (1997).

62 611 F 3d 922 at 924 (2010) per Judge Shepherd, Judges Bye and Melloy concurring (footnote omitted)

63 See *Evidence Act* 1995 (Cth), ss 184 and 191; *Evidence Act* 1995 (NSW), ss 184 and 191; *Evidence Act* 2001 (Tas), ss 184 and 191; *Evidence Act* 2008 (Vic), ss 184 and 191; *Evidence Act* 2011 (ACT), ss 184 and 191; *Evidence Act* 1929 (SA), s 34; *Criminal Code* 1899 (Q), s 644; *Evidence Act* 1906 (WA), s 32; *Criminal Code* (NT), s 379.

64 See the cases set out in *Stubley v Western Australia* (2011) 242 CLR 374 at 402 [94], n 75; [2011] HCA 7.

65 *Old Chief v United States* 519 US 172 at 200 (1997) per O'Connor J, with whom Rehnquist CJ, Scalia and Thomas JJ joined.

51 Fifthly, although both the majority and the minority in *Old Chief v United States* took into consideration the impact of the majority rule on the prosecution's choices, in Australia it would be necessary to consider its relationship with the prosecution's duties as well, particularly where the evidence objected to came from a witness. In Australia the prosecution is under a general, though not absolute, duty to call all available witnesses.

"Probative value": *Driscoll v The Queen*

52 The appellant also claimed support for his argument about the meaning of "probative value" in ss 135 and 137 from *Driscoll v The Queen*[66]. The appellant submitted that s 137 was based on what the Australian Law Reform Commission called a common law "discretion to exclude evidence adduced by the prosecution if it is more prejudicial than probative."[67] This "discretion" was discussed in *Driscoll v The Queen*. That case examined what was, at that time, a growing problem. The problem arose because there was no general practice by which interviews between police officers and suspected persons were mechanically recorded. A typical manifestation of the problem was as follows. Police officers would testify that the accused had made an oral confession; that a written record of the interview in which it was given had then been prepared; that the accused had acknowledged its correctness; but that the accused had then refused to sign it. The accused might then deny at the trial having made the oral confession or having acknowledged the correctness of the written record.

53 This posed difficulties for the just and reasonably expeditious conduct of trials. Those difficulties have been much reduced by two factors. One is the wider availability of equipment for making audiovisual and audio recordings of police interrogations. The other is legislation requiring the making of those recordings as a condition of admissibility[68]. However, the problem was regarded as very serious at the time *Driscoll v The Queen* was decided. It was believed that in some cases police officers were lying about whether the oral confession

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66 (1977) 137 CLR 517; [1977] HCA 43.

67 Australian Law Reform Commission, *Evidence*, Report No 26, (1985), vol 1 at 529 [957].

68 *Crimes Act* 1914 (Cth), ss 23A(6) and 23V; *Criminal Procedure Act* 1986 (NSW), s 281; *Crimes Act* 1958 (Vic), s 464H; *Summary Offences Act* 1953 (SA), s 74D; *Police Powers and Responsibilities Act* 2000 (Q), s 436; *Criminal Investigation Act* 2006 (WA), s 118; *Evidence Act* 2001 (Tas), s 85A; *Police Administration Act* (NT), s 142; *Crimes Act* 1900 (ACT), s 187. For the history, see *Kelly v The Queen* (2004) 218 CLR 216 at 225-230 [22]-[37]; [2004] HCA 12.

had been made. It was believed that in other cases accused persons were lying on that topic. The circumstances gave police officers a considerable amount of power. Some police officers were motivated by an excess of zeal. They desired to ensure the conviction of those whom they believed to be guilty, even though they lacked complete evidence of guilt. For their part, accused persons by the time of their trials had got into an uncomfortable position, giving them a strong motive to lie about what they might have said before their trials. It was difficult to judge where the truth lay.

54 At the time *Driscoll v The Queen* was decided, the orthodox position in relation to admissibility was as follows. The police officers could give evidence about their recollections of the oral confession. In giving that evidence, witnesses who prepared or supervised the preparation of a statement for the accused to sign, or who read it while the facts were fresh in their memories, could refresh their memories, before the trial or in court[69]. That would not make the statement itself admissible. Nor would giving a cross-examiner access to it for the purposes of inspection make it admissible[70]. It could only become admissible if the cross-examiner cross-examined on parts of the document not used to refresh memory. If the police officers were not able to testify that the accused had adopted the record of a confession, by signature or otherwise, that record was not admissible[71]. However, if the accused had adopted the record, by signature or by some other means to which the police officers testified, it was, strictly speaking, admissible[72].

55 In *Driscoll v The Queen* Gibbs J (Mason, Jacobs and Murphy JJ concurring) made a valuable statement about the law and the problem. It falls into three parts.

56 The first was[73]:

> "It has long been established that the judge presiding at a criminal trial has a discretion to exclude evidence if the strict rules of admissibility would operate unfairly against the accused. The exercise of this discretion is particularly called for if the evidence has little or no weight, but may be gravely prejudicial to the accused".

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69 *Driscoll v The Queen* (1977) 137 CLR 517 at 523 and 541.

70 *Driscoll v The Queen* (1977) 137 CLR 517 at 523.

71 *Driscoll v The Queen* (1977) 137 CLR 517 at 523.

72 *Driscoll v The Queen* (1977) 137 CLR 517 at 523 and 541.

73 (1977) 137 CLR 517 at 541.

This is a reference to the common law principles which predated s 137. Those principles rested on the idea of "discretion", unlike s 137.

57 In the second part, Gibbs J said the following about unsigned records of interview[74]:

> "It is manifestly in the interests of justice that wherever possible a contemporaneous written record should be prepared of the interrogation by the police of a person suspected of having committed a serious crime. Any person who prepared or supervised the preparation of such a record, or read it while the facts were fresh in his memory, could use it to refresh his memory, either before the trial or if necessary in court. In *Reg v Ragen*[75], McClemens J suggested that it would be more satisfactory to put before the jury the contemporaneous record itself than to allow a witness to give oral evidence which he had probably learnt by heart after studying the record. *The answer to this suggestion is that as a general rule such a record, if unsigned, will add nothing to the weight of the testimony of the police officers who give oral evidence as to what was said in the course of the interrogation, and will in itself be of little evidential value*." (emphasis added)

The appellant relied strongly on the italicised sentence.

58 The third part of what Gibbs J said was[76]:

> "The fact that a police officer has sworn that the accused adopted the record makes it legally admissible, but it is for the jury to decide whether they are satisfied that the accused did adopt it and if they are not so satisfied they may not use it in reaching their decision. The fact that the record had been prepared would in most cases be of no assistance to the jury in deciding whether the accused person had adopted it. The mere existence of a record is no safeguard against perjury. If the police officers are prepared to give false testimony as to what the accused said, it may be expected that they will not shrink from compiling a false document as well. The danger is that a jury may erroneously regard the written record as in some way strengthening or corroborating the oral testimony. Moreover the record, if admitted, will be taken into the jury room when the jury retire to consider their verdict, and by its very availability may have an influence upon their deliberations which is out of all proportion to

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74 (1977) 137 CLR 517 at 541.

75 (1964) 81 WN (NSW) (Pt 1) 572 at 574.

76 (1977) 137 CLR 517 at 541-542.

> its real weight. For these reasons, it would appear to me that in all cases in which an unsigned record of interview is tendered the judge should give the most careful consideration to the question whether it is desirable in the interests of justice that it should be excluded."

59 In the third part Gibbs J was pointing to two sources of unfairness or prejudice to the accused created by evidence about the accused's adoption of an unsigned record of interview. The evidence was inherently suspicious. If the police officers were correct in saying that the accused confessed, the fact that soon after the confession the accused declined to sign a record of the confession called for explanation.

60 There is only one aspect of *Driscoll v The Queen* which could be said to advance the appellant's argument that the reasoning in *Old Chief v United States* applies to ss 135 or 137, or applied in relation to the common law principles which preceded them. That is the italicised sentence quoted above in the second part of Gibbs J's statement. However, it does not in fact support the appellant's argument. Gibbs J's statement that an unsigned record of interview used to refresh memory will add nothing to the weight of the police officers' testimony about the confession is correct. A record of interview neither signed nor otherwise acknowledged by the accused to be correct was inadmissible. It contravened the rule against hearsay. At that time, in most Australian jurisdictions, there was no applicable exception to that rule, and in particular no exception for business records. Hence the only admissible evidence was the oral evidence of the confession. Where oral evidence had been given by a witness who had refreshed memory from a document, a change in the law to permit reception of the document into evidence would have added nothing to the weight of the testimony. The document was not independent of the witness. The testimony would very often have been wholly or partly a product of having read the document. The same considerations also explain Gibbs J's statement that a record of interview "will in itself be of little evidential value" where it has not been acknowledged by signature. That was equally true of records of interview not otherwise acknowledged.

61 In the second passage, Gibbs J was not propounding any general doctrine that the probative value of a particular piece of evidence depended on assessing its marginal significance when compared to the other evidence in the case. The conclusions in *Old Chief v United States* rest on a comparison between two admissible pieces of evidence. Gibbs J was not comparing two admissible items of evidence and deciding that in view of the existence of the first the probative value of the second was "discounted". Instead Gibbs J was comparing two pieces of evidence. One was admissible – the oral testimony. The other was inadmissible – the unsigned record of interview. Gibbs J made the comparison in order to reject the suggestion that a hearsay exception be created.

62 In contrast, in the third part of what he said, Gibbs J was comparing two pieces of evidence which were, strictly speaking, admissible. He was making the point that the unsigned record of interview which a police officer swore had been adopted by the accused might have little weight. But that was not because its probative value was to be "discounted" in view of the oral evidence. It was simply because the oral evidence about the accused making the confession and the oral evidence about the accused adopting the record of interview had the same source.

63 For these reasons *Driscoll v The Queen* does not support the appellant's submission that s 137 should be given a construction similar to that which the majority in *Old Chief v United States* gave to r 403 of the Federal Rules of Evidence.

Slicing up evidence

64 A further problem with the appellant's argument is that it depends on the proposition that "even though two statements may be understood to contain the same content, they are still two discrete items of evidence". Thus the appellant argued:

> "The statement '99.9% of people in the general population would not have a DNA profile matching the hair' is, literally speaking, a different statement to '1 in 1600 people in the general population would be expected to share the DNA profile found in the hair', regardless of whether the substantive 'content' of the two statements is the same."

This proposition is highly questionable.

"Probative value" considered

65 Before the argument based on *Old Chief v United States* which the appellant advanced could be accepted or rejected, it would be necessary to analyse the considerations set out above[77], and no doubt others, in greater detail. It is not appropriate to undertake that task in this case. Even if the appellant's argument were sound, and the probative value of the exclusion percentage evidence were "discounted" accordingly, there was no unfair prejudice to outweigh it. That is so for the reasons given below[78].

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77 At [46]-[51].

78 At [75]-[76].

Unfair prejudice: the appellant's case

66 The appellant submitted that the evidence that 99.9% of the population could not be the offender created prejudice of the following kinds. It encouraged mathematical rather than deductive reasoning. It carried a risk of fallacious reasoning, including encouraging the jury to give undue attention to the seeming precision of figures. And it distracted attention from what should have been the central focus – the possibility that the hair found on the deceased was not the appellant's but someone else's. The appellant relied on *R v GK*[79], which held that DNA evidence giving a relative chance of paternity of 99.9995% and 99.9993% was rightly excluded under s 137. The basis for exclusion was "the residual risk of unfairness deriving from the subliminal impact of the raw percentage figures"[80]. The appellant also relied on *R v JCG*[81], which followed *R v GK*. The appellant submitted that since those decisions it had become common practice in Australian courts for evidence of the statistical probability of a DNA match to be expressed as a "random occurrence ratio" or a "frequency estimate", rather than as an "exclusion percentage". The appellant relied on *R v Doheny*[82], in which the latter practice was disfavoured. The appellant relied on writings by experts, including analysis of experimental research, on juror comprehension, or incomprehension, of DNA evidence. This Court was taken to some of these writings. McClellan CJ at CL relied on writings of that kind in his dissenting judgment[83]. Two problems arise. The first is that according to the appellant in this Court, that material was not relied on by either party in the Court of Criminal Appeal and was not raised in argument for their consideration. The second problem is that no evidence supporting the reasoning in the expert writings had been tendered to the trial judge or to the Court of Criminal Appeal.

67 So far as the first problem is concerned, in view of the fact that the learned Chief Judge was in dissent, it cannot be said that the party against whom he found, the prosecution, was not given an opportunity to deal with a point on which that party lost, for it did not lose: the majority accepted its submissions[84].

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79 (2001) 53 NSWLR 317.

80 *R v GK* (2001) 53 NSWLR 317 at 341 [100] per Sully J (Mason P and Dowd J concurring).

81 (2001) 127 A Crim R 493.

82 [1997] 1 Cr App R 369 at 374-375.

83 *Aytugrul v The Queen* (2010) 205 A Crim R 157 at 174-177 [89]-[102].

84 *Woods v Multi-Sport Holdings Pty Ltd* (2002) 208 CLR 460 at 511 [165]; [2002] HCA 9; *Thomas v Mowbray* (2007) 233 CLR 307 at 521 [636]; [2007] HCA 33. See also McCormick,"Judicial Notice" (1952) 5 *Vanderbilt Law Review* 296 at 318.

The appellant did accept that it was desirable that material of that kind be ventilated with the parties so that the party against whose interests the material operates can seek to deal with it. That is certainly so if that party loses on the point. It may be that dissenting judges have greater latitude than majority judges in this respect: their views are adverse to the winning party, but can do that party no harm.

68 The second problem is that the court is unaided by contributions from the parties in relation to understanding the material and in relation to the possibility that other experts disagree with or wish to qualify its teachings. The problem is alleviated when the material is received through expert witnesses.

69 The teachings of the expert material could have been employed in two ways. They could have been employed before the jury as a warning against the dangers of uncritically accepting the statistical evidence. So used, the material would have been similar to evidence admitted in the United States about the fallibility of eyewitness identification[85], the low rate of recidivism among those convicted of murder on a hearing to determine sentence[86], the relevance of "battered woman syndrome" to self-defence[87] and the characteristics of abused children[88]. And, so used, it would have been similar to evidence admitted in Australia about "infantile amnesia"[89], the effect of mental impairment on a witness's powers of observation, recollection or expression[90], the language or communications difficulties bearing on the ability of Aboriginal witnesses to give reliable or complete evidence[91], the relevance of "battered woman

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85 For example, *State v Chapple* 660 P 2d 1208 at 1218-1224 (Ariz SC 1983); *The People v McDonald* 690 P 2d 709 at 715-727 (Cal SC 1984); *United States v Downing* 753 F 2d 1224 at 1231-1232 (3rd Cir 1985); *State v Buell* 489 NE 2d 795 at 801-803 (Ohio SC 1986).

86 *State v Davis* 477 A 2d 308 at 311 (NJSC 1984).

87 *State v Kelly* 478 A 2d 364 at 375-378 (NJSC 1984).

88 *State v Myers* 359 NW 2d 604 at 608-611 (Min SC 1984); *HG v The Queen* (1999) 197 CLR 414 at 432-433 [59]-[65]; [1999] HCA 2.

89 *R v BDX* (2009) 24 VR 288 at 298-305.

90 *Farrell v The Queen* (1998) 194 CLR 286; [1998] HCA 50.

91 *Jango v Northern Territory (No 4)* (2004) 214 ALR 608 at 615 [40].

syndrome" to duress[92], the incidence of recovered memory syndrome[93] and the effects on children of separation from their parents[94].

70 Material of this kind does not establish "adjudicative facts". Adjudicative facts are those facts which are in issue or are relevant to a fact in issue and are determined by the jury, or, in non-jury trials, by the trial judge. Dixon CJ described them as "ordinary questions of fact which arise between the parties because one asserts and the other denies that events have occurred bringing one of them within some criterion of liability or excuse set up by the law".[95] But the material just referred to establishes general principles against which the court can assess particular evidence, or the conduct of a party or witness. That is, it helps the court to assess adjudicative facts. When material of this kind is so used, it must be established by evidence. The appellant's reliance on the material was rather directed to establishing that "exclusion percentage" evidence was always or almost always so prejudicial, and so little lacking in probative value once "frequency estimate" evidence had been admitted, that s 137 should invariably be employed to exclude it. Section 137 is not expressed in the language of discretion, but it does depend on a weighing process. The inquiry is whether the probative value of a specific piece of evidence is "outweighed" by the danger of unfair prejudice flowing from that specific piece of evidence. An inquiry of that kind is not lightly to be trammelled by universal or general rules.

71 Putting that problem aside, the appellant appeared to be urging the creation of a legal rule, in the sense of a hitherto unsuspected construction of s 137. He did so by recourse to the "legislative facts" to be found in the expert material. Legislative facts are to be distinguished from "adjudicative facts". Legislative facts are those which help the court to determine what a common law rule should be or how a statute should be construed[96]. They reveal how existing rules work and how rules which do not exist might work if they were adopted. Sometimes legislative facts can legitimately be derived by analysing factual material not tendered in evidence either at trial or on appeal. That analysis can operate in many fields, but some of them are fields dependent on expert learning. Thus sometimes general references are made by courts to the causes of

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92 *R v Runjanjic* (1991) 56 SASR 114.

93 *R v Bartlett* [1996] 2 VR 687 at 694-696.

94 *Trevorrow v South Australia (No 5)* (2007) 98 SASR 136 at 283-285 [689]-[705].

95 *Breen v Sneddon* (1961) 106 CLR 406 at 411; [1961] HCA 67.

96 For the different types of legislative fact, see *Thomas v Mowbray* (2007) 233 CLR 307 at 512 [614].

psychiatric injury[97] and the diagnosis of psychiatric illness[98]. Sometimes more specific reasoning is propounded after the court has had recourse to expert literature. Medical works have been taken into account in assessing the causation and foreseeability of psychiatric injury[99]. Works on psychology have been considered in formulating rules about identification evidence[100], both directly[101] and indirectly[102]. This is not surprising, since the court's recognition of the "inherent frailties of identification evidence" has been said to arise "from the psychological fact of the unreliability of human observation and recollection."[103] If frailty rests on a psychological fact, and on psychological research[104], expert material bearing on the psychological fact must have potential significance. Works on psychiatry have also been considered in explaining why children delay in complaining of sexual assault in relation to the unsafe and unsatisfactory ground of criminal appeal[105]. Expert studies on prison informants have been relied on to justify the proposition that evidence from that source may be tainted, and hence to justify the giving of warnings about it[106]. Psychiatric studies on the harm suffered by child victims of sexual offences have been taken into account in developing sentencing principles[107]. Accounting textbooks have been referred to

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97 *Gifford v Strang Patrick Stevedoring Pty Ltd* (2003) 214 CLR 269 at 304 [99]; [2003] HCA 33.

98 *Tame v New South Wales* (2002) 211 CLR 317 at 420 [308]; [2002] HCA 35.

99 *Jaensch v Coffey* (1984) 155 CLR 549 at 600-601; [1984] HCA 52. See also *Tame v New South Wales* (2002) 211 CLR 317 at 416 [293].

100 *Winmar v Western Australia* (2007) 35 WAR 159 at 167 [29]-[30] and 171-172 [50]-[54].

101 *Smith v The Queen* (2001) 206 CLR 650 at 667-668 [55]-[57]; [2001] HCA 50.

102 *The People (Attorney-General) v Casey (No 2)* [1963] IR 33 at 39; *R v Gaunt* [1964] NSWR 864 at 866.

103 *R v Sutton* [1970] 2 OR 358 at 368 per Jessup JA (Gale CJO and Kelly JA concurring), approved in *Alexander v The Queen* (1981) 145 CLR 395 at 435; [1981] HCA 17.

104 *The People (Attorney-General) v Casey (No 2)* [1963] IR 33 at 38; *Longman v The Queen* (1989) 168 CLR 79 at 108; [1989] HCA 60.

105 *Jones v The Queen* (1997) 191 CLR 439 at 463; [1997] HCA 56.

106 *Pollitt v The Queen* (1992) 174 CLR 558 at 615; [1992] HCA 35.

107 *Ryan v The Queen* (2001) 206 CLR 267 at 281 [42]; [2001] HCA 21.

in order to explain the differences between two methods of accounting. The goal was to determine which method reflected the legal test for accounting for general overheads in relation to an account of profits as a result of patent infringement[108]. Considerable reliance has been placed on environmental health studies in concluding that landlords had a duty of care to the son of tenants[109].

72 The appellant did not make clear how this Court could take the expert material into account.

73 One possibility was by way of judicial notice. Assuming that s 144 of the Act[110] impliedly abolishes the corresponding common law doctrine of judicial notice[111], a question arises. Does s 144 apply to the reception of legislative facts? If it does, there is a difficulty: it was not established that the material was "not reasonably open to question". However, s 144 may not apply to the reception of legislative facts: the Australian Law Reform Commission itself was in some doubt about its application to a particular type of legislative fact called "constitutional facts"[112]. If it does not, and if the common law position continues, it is unlikely that the material was sufficiently uncontroversial for judicial notice to be taken of it.

74 Another possibility is to treat the expert material as a matter of "common knowledge". The courts have relied on legislative facts as being within matters of "common knowledge" in a sense much wider than that used in s 144. That is, they have resorted to legislative facts even though they could not be said to be "not reasonably open to question" because minds differ about them. However, the level of technical sophistication involved in the material on which the appellant relied is so great that it would not be satisfactory for this Court to take it into account without the assistance of expert witnesses who had been cross-examined. It would be very difficult for this Court, without that aid, to resolve any controversies which may arise. To borrow the words of Judge Frank

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108 *Dart Industries Inc v The Decor Corporation Pty Ltd* (1993) 179 CLR 101 at 126-127; [1993] HCA 54.

109 *Jones v Bartlett* (2000) 205 CLR 166 at 196-198 [106]-[111]; [2000] HCA 56.

110 See above at [21] n 30.

111 *Gattellaro v Westpac Banking Corporation* (2004) 78 ALJR 394 at 397-398 [17]-[18] and 405 [69]; 204 ALR 258 at 262 and 272; [2004] HCA 6. Before that decision the contrary had been assumed: *Prentice v Cummins (No 5)* (2002) 124 FCR 67 at 85-87 [75]-[82].

112 Australian Law Reform Commission, *Evidence*, Report No 26, (1985), vol 1 at 546 [977].

speaking about psychiatry, it would be dangerous for the Court "to embark – without a pilot, rudder, compass or radar – on an amateur's voyage on [this] fog-enshrouded sea."[113] The appellant submitted that the respondent had not made "any significant challenge to the research" relied on. Even if this is so – and the respondent disagreed – if the expert material were to be taken into account, it was highly preferable that it be presented through expert witnesses, preferably during a pre-trial hearing to determine admissibility. The admissibility and weight of the expert material could then be considered publicly and critically.

Unfair prejudice

75 There was no unfair prejudice for the following reasons. No doubt both the "frequency estimate" and the "exclusion percentage" evidence, like many other aspects of the expert evidence, were difficult for the jury to deal with. The field is arcane. But any criminal jury of 12 is likely to contain at least one juror capable of realising, and demonstrating to the other jurors, that the frequency estimate was the same as the exclusion percentage. Further, detailed evidence was given about how the "exclusion percentage" evidence was derived from the concededly admissible "frequency estimate" evidence, and how their significance was identical. The case is entirely distinguishable from cases like *R v GK*, where a higher exclusion percentage was used in a quite different fashion. Those cases are authorities for what they decide. They do not establish absolute rules[114]. The trial judge made it plain while argument was proceeding about the reception of the "exclusion percentage" that no-one participating in the trial would express that percentage as being "somewhat like the 'prosecutor's fallacy', that is it's 99 percent sure that it is the accused". No-one did. In addition the reception of evidence which might sometimes create unfair prejudice can be lawful if the conduct of the trial, including the possibility of a curative influence from other evidence, from counsel's handling of the impugned evidence and from the trial judge's directions, is likely to nullify or water down the prejudice. Whether this was foreseeable or not at the time of tender, counsel here treated the exclusion percentage as a minor aspect of the case. It was mentioned only rarely. After its initial reception, it was mentioned once by Gina Pineda, once by a defence witness and not at all by counsel in address. The trial judge's summing up pointed out that the exclusion percentage was "another way" or "the reverse way" of putting the frequency estimate. The trial judge warned against treating the mitochondrial haplotype evidence as "definitely" or "necessarily" establishing that the hair came from the appellant. There was no request from the appellant for the trial judge to withdraw any part of his summing up, or to give a curative

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113 *United States v Flores-Rodriguez* 237 F 2d 405 at 412 (2nd Cir 1956).

114 See *R v JCG* (2001) 127 A Crim R 493 at 504 [50].

direction or warning. There is no ground of appeal in this Court that the summing up was wrong. Even if not all these post-tender events were foreseeable, they amounted, as Wigmore might have said, to a restrospectant demonstration that there was no unfairness.

76 Once it was accepted that the "frequency estimate" evidence was admissible, the reception of the "exclusion percentage" evidence did not create a danger of unfair prejudice within the meaning of s 137.

Misleading and confusing effect: s 135(b)

77 Nor, in the specific circumstances of this trial, was the "exclusion percentage" evidence attended by a danger that it might be misleading or confusing.

Order

78 The appeal must be dismissed.