

No. 96/6927/Z5

IN THE COURT OF APPEAL  
CRIMINAL DIVISION

Royal Courts of Justice  
The Strand  
London WC2

Thursday 16 October 1997

B e f o r e:

THE LORD CHIEF JUSTICE OF ENGLAND  
(Lord Bingham of Cornhill)

MR JUSTICE POTTS

and

MR JUSTICE BUTTERFIELD

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R E G I N A

- v -

DENIS JOHN ADAMS

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(Official Shorthand Writers to the Court)

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MR RONALD THWAITES QC and MR MARC BRITAIN appeared on behalf of  
THE APPELLANT

MR ORLANDO POWNALL and MISS SUSAN TAPPING appeared on behalf of  
THE CROWN

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JUDGMENT  
(As Approved by the Court)

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Thursday 16 October 1997

THE LORD CHIEF JUSTICE: On 13 September 1996, in the Central Criminal Court, before His Honour Judge Pownall QC and a jury, the appellant was convicted of rape and sentenced accordingly. He appeals against conviction by leave of the single judge.

The background facts can for present purposes be very briefly summarised. The victim of the offence was a Miss M who was walking home after an evening out on 6 April 1991. Her attacker was a stranger. He approached and asked her the time. She saw his face for a matter of seconds before looking at her watch. He raped her from behind. She reported the attack to the police and a DNA profile was obtained from semen on a high vaginal swab. In October 1993 she attended an identification parade, but did not pick out the appellant or anyone else. At committal proceedings she said that the appellant did not look like the man who had attacked her. The appellant was 37 and the complainant said at one stage in her evidence that he looked at the time of her observation 40 to 42. The description she had given was of a white, clean-shaven man with a local accent, aged 20 to 25.

The prosecution case rested entirely upon expert evidence in relation to the DNA sample, which was challenged by the defence. In evidence the appellant gave an alibi for the night of the attack, which he said he had spent with his girlfriend, who also gave evidence before the jury at a trial which resulted in his conviction on 24 January 1995.

The recitation of the facts which we have just given is taken from the judgment of the Court of Appeal when that conviction was the subject of challenge. On 26 April 1996 the Court of Appeal quashed that conviction and ordered a re-trial. The grounds of appeal argued at that time were two-fold: first, that the DNA evidence upon which the Crown had relied was incapable on its own of establishing guilt; and secondly, that the judge had dealt inadequately with evidence of the Bayes Theorem in its application to the facts of the case upon which the defence had relied.

In its judgment reported in [1996] 2 Cr App R 467, the court rejected the argument that DNA evidence alone was incapable of establishing guilt, but the court did conclude that the trial judge's

directions on the Bayes Theorem evidence had left the jury without adequate guidance as to how to evaluate the DNA evidence in the light of the non-DNA evidence. The court went on to observe per incuriam that it had grave doubt whether the Bayes Theorem evidence was admissible at all. There had been no argument to the effect that it was not, and the court accordingly felt unable to give an authoritative ruling.

The quashing of that first conviction led to a re-trial. In the course of the re-trial the defence once again invited the jury to pay attention to Bayesian evidence directed to calculation of the probabilities of the non-DNA evidence being true or false as the case might be, with a view to calculating the overall probability based on the DNA evidence, and on that occasion provided the jury with a questionnaire to enable them to make the appropriate calculations. We shall come in due course to the grounds upon which this appeal has been mounted.

At the re-trial the Crown's case rested, as it had done at the first trial, solely on DNA evidence based on the vaginal swab which had been taken from the victim. The Crown called a witness, Dr Harris, who gave evidence that the profile from the high vaginal swab matched the profile of the appellant's blood sample. Comparison was made with the database of the white European population, and the chances of another man having the same DNA profile was calculated to be 1 in 2 million. This calculation had been made on the basis of four probes, including a DNA band which had been so weak as to necessitate Dr Harris highlighting it. If that band were excluded, the probability would be reduced to 1 in 200,000, but Dr Harris's evidence was that there was no reason why that band should be considered unreliable. Later, a fifth probe had been extracted, producing another two bands of DNA. The resulting revised probability was extended to a 1 in 200 million chance that a man unrelated to the applicant had the same profile.

The defence had put in evidence the existence of the appellant's brother. The DNA experts acknowledged that he was a complicating factor whose existence reduced the probability of a match to 1 in 220. It was not, however, suggested at the trial that the brother was the assailant of the victim and he did not in any event fit her description.

The Crown called a second prosecution expert, a Mr Lambert, who gave evidence that he had checked Dr Harris's figures with a specialist software package, and it was his opinion that the figures given were reasonable and fair.

That evidence called on behalf of the Crown was the subject of criticism and close questioning on behalf of the defence. In support of those criticisms the defence called a very distinguished statistician, Professor Donnelly. He gave evidence that the figure of 1 in 200,000 was invalid and in his judgment seriously overstated the strength of the DNA evidence. He criticised the small size of the database from which the figure was calculated as too small, with the consequent danger that it would not be truly representative of the population. His opinion was that with a larger database a different figure could have been reached. He was also critical of Dr Harris for having drawn in with a pen one of the bands which had faded when re-examined. He regarded this as a serious flaw and one which would affect any later calculation. This was not a view which Dr Harris accepted, his opinion being that the practice which he had adopted was wholly professional and acceptable on the ground that he had not drawn in something which was not there, but had merely recreated something which had been there so that the computer could recognise it.

Professor Donnelly also criticised the Crown's figures as failing to include a proper correction to allow for sampling errors, although he declined, understandably perhaps, to give precise estimates of what correction should have been made. He showed however that a 1% correction would reduce the probability to perhaps 1 in 100 million instead of 1 in 200 million. The view of the prosecution experts was that such a correction would actually have made the DNA evidence stronger, and their opinion was that while some of these criticisms would have had the effect of lowering the figure that they had given, this was more than outweighed by the allowances which had already been made in calculating those figures.

This was, as it seems to us, exactly the sort of evidence and the sort of cross-examination which is to be found in these cases. The findings of the Crown were available for consideration and evaluation by the defence. They had an opportunity to make such criticisms as they thought fit. All

those matters were before the jury and a proper subject for their consideration.

There was, however, a further and for present purposes a very important dimension to Professor Donnelly's evidence. This relates to his explanation and application of Bayes Theorem. This is a method by which non-DNA evidence could in his opinion be expressed in terms of mathematical probability and so could more readily be applied to the DNA figures so as to reduce the probabilities if the jury judged it appropriate. The transcript shows that there was a long and detailed explanation by Professor Donnelly of how the theorem operated, and he introduced the jury in very considerable detail to the questionnaire which had been prepared. We have had the opportunity to study that document. We observe that it has on it its own instructions as to how it is to be used, instructions which Professor Donnelly explained to the jury in more detail as he gave his evidence.

In presenting this appeal Mr Thwaites QC has most helpfully prepared a written summary of his argument and provided the court with the documents upon which that argument relies. We hope the court will not be thought to have neglected the details of the argument if a summary of it is attempted. In essence Mr Thwaites has argued three points. First, he submits that the prosecution in a case of this kind should not be allowed to adduce statistical evidence regarding the random occurrence ratio of a DNA match unless the defence are allowed to call appropriate Bayesian evidence to show how such figures could be reduced in giving effect to the probabilities attached to non- scientific, non-DNA evidence. Secondly, in support of that he submits that the Bayesian approach is logical, sound and approved by expert opinion. Thirdly, he submits that, evidence having been admitted of the Bayesian approach in this case, the judge should have directed the jury fully and not encouraged them to apply their common sense in contradistinction to the Bayesian approach described by Professor Donnelly. It is, we think, convenient to approach those questions in the reverse order.

Having summed up the detailed evidence relating to the points concerning the Crown's DNA evidence, at page 24 of the transcript of the summing-up His Honour Judge Pownall said:

"That is an outline of the defence case and if this were any other case that would be virtually all I had to say to you before asking you to retire and consider your verdict, but of course this case is not like any other case and, as I said at the beginning, it is unique, I think; unique because it is the first case in which a jury have been asked to operate Bayes Theorem and that is because it is, I believe, the first case in which the prosecution have relied almost entirely upon the DNA evidence; evidence which they say is positively overwhelming and the Crown have, as they nearly always do in cases involving DNA, put their case into figures and indeed you have heard those figures. The chance of some other man in the white European population of this country having the same matching bands as were found in this case is one in 200 million, and the lower figures if the position is different.

Before you came into this case I was asked by the defence whether I would allow them to put their case into figures and it seemed to me, to cut a long story short, only fair that if I were to allow one side to do so, I should allow the other to also, and the particular way in which they have sought to do that is by the use of Bayes Theorem. That is a result in probability theory, a rule of logic, the point of it being that once certain numerical judgments are made, certain others must necessarily follow. So it is that you have with you a list of questions, lettered almost through, straight through the alphabet from A to X inclusive, in answer to which you may put either a number or a percentage number, as the case may be, and if you were to do it, having done it, you will have reached the last page on which is a formula and, having substituted figures for the letters and, with the help of your calculators, done the multiplying and dividing, you would come to the resulting equation and if you then follow the three steps, as instructed, you will have an end figure and that would be your view of the probability that this defendant was the rapist. In my view it would not be right for me to tell you more about the questionnaire because if I did I would simply be trespassing on what is essentially your task. You have the questions and if you think you can answer them you have the little boxes to put the answers in. I dare say none of you have ever used Bayes Theorem to decide anything in your lives before, nor have you ever given numbers or percentages to your views in logical steps. It is entirely a matter for you whether you use this method to reach your verdict or whether you use the methods which juries in this country have used for many, many years, pretty satisfactorily. It is, perhaps, the difference between what Mr Lambert called the statistical approach and the common sense approach.

I ought to remind you, though, that although Professor Donnelly is the prime advocate for the use of this theorem and, indeed, takes the view that it is the only way of doing it logically, Mr Lambert agrees that Bayes is a logical and consistent way of expressing in figures the non-DNA evidence, but he also thinks that people without statistical training and experience will find it a very difficult and complicated exercise. Although he is not against the exercise, Mr Lambert has very serious misgivings about putting it into practice in a jury trial because, for example, it does not cover all the relevant factors or all the relevant

evidence, or all that you might think was relevant. It might be thought too that the questionnaire does not include a box for you to enter your figure for Mr Adams's own evidence and how he gave it, or the difficulties or otherwise that Miss [M] had in being asked to identify her rapist. Those are just examples and there may be others.

If you feel able to use the questionnaire to operate Bayes Theorem and you find it almost as easy as kiss your hand to give the answers, then there you have the opportunity to do it, having not only your own copies but you will have when you go out an extra blank one to fill in your collective view if you want to. If you do not wish to use it that is your privilege and your own private decision and no one will criticise you for not using it. There is absolutely no compulsion on you to use it at all. It is there if you want to use it and follow the instructions given. It was suggested by Mr Thwaites that you might think it only fair to this defendant for at least one of you to do it. I hope he will forgive me if I discourage that and for this reason: Your duty, when it comes first thing tomorrow morning, is to retire, consider your verdict amongst yourselves, all of you together and not with one huddled in a corner with his calculator. All of you should take part in your discussions, each listening to the arguments of the others and in the end reaching your collective verdict, the verdict of you all. If you want to use it then please use it in a collective way so that you are all having an input into it and putting the answers, if you feel able to, in the blank copy that you will have first thing tomorrow morning."

Of that direction Mr Thwaites on behalf of the appellant makes a number of criticisms. First, he criticises the failure of the judge to summarise the effect of the evidence given orally by Professor Donnelly. We have to confess that the task of attempting to summarise the 40 or so pages of evidence given by Professor Donnelly is one that would make any judge quail; the risk of error would be obvious. More fundamentally, however, it seems to us, as it plainly seemed to the judge, that the questionnaire having been explained by its author in very considerable detail, and the jury taken through it without Professor Donnelly trespassing into the jury's domain by suggesting the figures which should go in the various boxes, and the document itself bearing its own instructions, it was unnecessary for him to do more than remind the jury of the fact which must have been prominent in their minds, that the defence were urging this methodological approach to the reaching of their verdict.

We cannot on the facts of this case find ground for criticism in the judge's failure to attempt a summary or precis of the evidence given by Professor Donnelly or in his failure to give any more



detailed account of the proper approach to the questionnaire.

Mr Thwaites criticises the distinction drawn by the judge between the statistical approach and the commonsense approach, but that does not appear to us to be a fair criticism. It is plain that the Bayesian approach could be described as statistical; it is certainly highly mathematical. The alternative approach is one which would not be based on figures but on a more conventional application of judgment to the various points made by the defence in urging the jury to discount the prosecution evidence. Again, it does not appear to us that the judge erred in his treatment of that matter.

Mr Thwaites further criticises the judge's suggestion that if the jury found it "as easy as kiss your hand" to give the answers, then they should use the questionnaire. Mr Thwaites says that that is a somewhat flippant expression to use and that on no showing could the use of the questionnaire be described as so easy an operation. We certainly share the view that the proper use of the questionnaire would be by no means straightforward, and it may be that the judge would have been better to have expressed the matter more solemnly, but the point was clear and the whole passage made it abundantly plain to the jury that if they found the Bayesian approach helpful then they were at complete liberty, having had it explained to them, to use it in their deliberations.

There are other more detailed points that have been made, but having considered the thrust of the summing-up on this aspect of the case we are not persuaded that it is open to criticism. It certainly does not persuade us that the conviction is as a result unsafe.

We turn therefore to the second of the three submissions which we recited, namely that the Bayesian approach is logically sound and approved by expert opinion. We would not for our part wish to take issue with that statement so long as it is applied to appropriate subject matter by persons competent to apply it. We have no reason to doubt, as is stated by a number of highly authoritative experts, that it is a sound and reliable methodological approach in some circumstances. We have, however, the gravest reservations about its use in jury trials in cases such as this.

This brings us to the first of the three submissions which we summarised. It appears to us

that there can be no possible ground of objection in principle to the leading of DNA evidence by the Crown, based as it is or should be on empirical statistical data, the data and the deductions drawn from it being available for the defence to criticise and challenge. The more difficult question is whether the fact that the prosecution are permitted to adduce evidence of that kind should lead to the conclusion that the defence should be at liberty to deploy evidence in support of the Bayesian approach to non-scientific, non-DNA evidence, as was done in this case.

We are bound to observe that this is not the first time in which this question has come before the courts. The matter was the subject of consideration, as already mentioned, when the first appeal in this case occurred. The judgment of the court given by Rose LJ turns to this aspect of the matter at page 480G. In a long passage ending on page 482E reasons are given for the court's conclusion that such evidence is inadmissible and ought not to have been admitted. It is unnecessary to read that passage, which speaks for itself and which it would not be easy to improve on as a statement of the difficulties and problems which would arise if reliance on such evidence in cases of this kind became common form.

We have also had our attention directed to a passage in R v Doheny and Adams [1997] 1 Cr App R 369, 374G, where Phillips LJ giving the judgment of the court said:

"It has been suggested that it may be appropriate for the statistician to expound to the jury a statistical approach to evaluating the likelihood that the defendant left the crime stain, using a formula which gives a numerical probability weighting to other pieces of evidence which bear on that question. This approach uses what is known as the Bayes Theorem. In the case of Adams (Denis) [1996] 2 Cr App R 467 this Court deprecated this exercise in these terms at p482:

'To introduce Bayes Theorem, or any similar method, into a criminal trial plunges the jury into inappropriate and unnecessary realms of theory and complexity deflecting them from their proper task.'

We would strongly endorse that comment."

We note that the judgment given in this case on 26 April 1996 has been the subject of consideration in

[1996] Crim LR 898, where the court's observations find favour with the commentator.

In the light of the previous rulings on this matter in this court, and having had the opportunity of considering the evidence in this case, we regard the reliance on evidence of this kind in such cases as a recipe for confusion, misunderstanding and misjudgment, possibly even among counsel, but very probably among judges and, as we conclude, almost certainly among jurors. It would seem to us that this was a case properly approached by the jury along conventional lines. That would involve them perhaps in asking themselves at the outset whether they accepted wholly or in part the DNA evidence called by the Crown. If the answer to that was "no", or uncertainty as to whether the answer was "yes" or "no", then that would be the end of the case. If, however, the jury concluded that they did accept the DNA evidence wholly or in part called by the Crown, then they would have to ask themselves whether they were satisfied that only X white European men in the United Kingdom would have a DNA profile matching that of the rapist who left the crime stain. It would be a matter for the jury, having heard the evidence, to give a value to X. They would then have to ask themselves whether they were satisfied that the defendant in question was one of those men. They would then go on to ask themselves whether they were satisfied that the defendant was the man who left the crime stain, bearing in mind on the facts of this case the obvious discrepancies between the victim's description of her assailant and the appearance of the appellant, the victim's failure to identify the appellant on the identification parade and the evidence of the appellant and the witnesses called by him. Consideration of this last question would of course involve the jury in assessing all the points made concerning the victim's opportunity to see her assailant, the likelihood of her description being accurate or inaccurate in all the circumstances, the significance of her failure to identify the appellant, the strength and weakness of the evidence given by the appellant and his witnesses, and all other matters relied on by the defence. Of course, it is a matter for the jury how they set about their task, and it is no part of this court's function to prescribe the course which their deliberations should take. But consideration of this case along the lines indicated would in our judgment reflect a normal course for a properly instructed jury to adopt. It is the sort of task which juries perform every day, carefully and conscientiously, on

the evidence, as they are sworn to do. We do not consider that they will be assisted in their task by reference to a very complex approach which they are unlikely to understand fully and even more unlikely to apply accurately, which we judge to be likely to confuse them and distract them from their consideration of the real questions on which they should seek to reach a unanimous conclusion. We are very clearly of opinion that in cases such as this, lacking special features absent here, expert evidence should not be admitted to induce juries to attach mathematical values to probabilities arising from non-scientific evidence adduced at the trial.

For all these reasons we dismiss this appeal.

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