



JUDICIARY OF
ENGLAND AND WALES

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Communicating the Science

The Expert Witness Institute Sir Michael Davies Lecture 2016

Those of you who have the odd hour to kill and are interested in the history of expert opinion evidence could do worse than look at an article a famous American judge called Learned Hand wrote at the beginning of the last century in the *Harvard Law Review*.¹ One of the questions he posed - pertinent for jury trials - was this:

“How can the jury judge between two statements each founded on an experience confessedly foreign in kind to their own? It is just because they are incompetent for such a task that the expert is necessary at all.”

I will come to his answer shortly. But before I do so, let us think for a moment about what we ask jurors to do.

The ordinary juror is given quite a task. Jurors are placed into an unfamiliar environment. They have to listen – sometimes for many weeks, or even months on end – to evidence, often without knowing why it has been called, and to endless questions - without knowing why they have been asked. At the end of the case, having been given the different pieces of the jigsaw, they are expected to put them together, and decide of immense importance, not only to the defendant of course, but also to the victim or victims of the crime, the families of those caught up in what has happened, and to the wider public.

¹ ‘Historical and Practical Considerations Regarding Expert Testimony’ (1901) L. Hand, 15 *Harvard Law Review* 40–58, 54.

This, after receiving a summing up from the judge – which itself can be lengthy, where they are given often complex directions of law, which they are told they must apply to the facts as they find them to be.

I have the greatest admiration for juries. My experience is that jurors, individually, and collectively take their task very seriously indeed. But it is stating the obvious to say everyone involved in the criminal process, including the judge and experts who give evidence before them should do everything possible to help them in what can be a challenging and daunting task.

Some years ago now, Trevor Grove, a journalist, wrote a book called the Juryman's Tale.² He abided by the rule that jurors must not give away the secrets of their retiring room, but he had sat on a jury at the Old Bailey on a kidnapping case that went on for many months and wrote a very entertaining and illuminating account of how things looked from the juries' point of view.

“We were legal amateurs, after all: a dozen very ordinary men and women, including a postman, a Heathrow cleaner, a retired schools' inspector and a Sainsbury's check-out lady. From the onset of the frosty winter of 1996 to the first days of the following spring, just as the 1997 general election was getting under way, our lives had been subjected to an immense upheaval. We had been frog-marched into a world we knew nothing of, speaking a language we sometimes barely understood, governed by regulations that made us feel we were back at school again. And when we got home from this topsy-turvy working day, we weren't even allowed to talk shop with our nearest and dearest.

For week after week we had been guided and misguided through a forest of bizarre criminal intrigue. ..Our credulity was alternatively appealed to and abused. Then, after four months of this, we had been abruptly abandoned and ordered to resolve our confusions as best we could on our own. We were like the befuddled lovers in *A Midsummer Night's Dream*, after Puck had scrambled their wits and left them sleeping on the forest floor. The judge's summing up was supposed to provide

² 'The Juryman's Tale', T. Grove, pub, Bloomsbury, 2000.

signposts towards the truth, which it did; but those that might have been of most use were subtly camouflaged in the legal undergrowth.

For nearly three and a half days we had sat deliberating: fifteen hours and fifty-five minutes, to be exact. We had had hundreds of hours of conflicting evidence to remember and resolve. Our jury room was submerged in stacks of ring-binders, documents in tottering heaps. There had been some eighty witnesses, a police video, scores of tape recordings and a hundred and three exhibits...Sheer weight of evidence, whatever its quality, can bamboozle the clearest mind.

Yet somehow we had found a road through the woods. And now, under the gaze of the whole court – the black-robed judge, the barristers in their horse-hair wigs, the ashen-faced prisoners, the police, the prison officers, the press – we had delivered our conclusion.”

It was guilty by the way.

The book is often recommended to those due to do jury service, but I think it is of interest to anyone who participates in the legal process.

The judge I am pleased to say got a gold star from Mr Grove. I suspect however that it did not prove comfortable reading for all of those involved, in particular one barrister, who had the habit of ending each question with the words “Do you follow? A habit that those on the jury found both mystifying and irritating in equal measure. Like many of Mr Grove’s observations, this example illustrates a truism; we often do not see or hear ourselves as others see and hear us.

One person who understood juries very well indeed, and was a master at communicating with them was Sir Michael Davies. I don’t know whether Sir Anthony Hooper, your esteemed Chairman, who invited me to speak tonight, knew this before he asked me to give the lecture named it in Sir Michael’s honour, but in fact Sir Michael and I knew each other well. I am not sure of the vintage of my eminent predecessors who have given this lecture. But it may well be I am the first who had the pleasure (not always unalloyed I should tell you in the interests of full disclosure)

of appearing in front of Sir Michael. He would however I hope have been pleased, though perhaps a little surprised, to see me addressing the distinguished members of the Institute of which he was the founding Father.

Sir Michael was the judge in charge of the jury lists, when libel cases were still tried by juries. And I appeared in front of him on many occasions over the years.

It was not unknown for experts to appear in his court, Court 13, at the Royal Courts of Justice, which saw its fair share of the Great and the Good, or not so good, appear in front of him in the high-profile libel trials that he loved presiding over, and in some of which I was fortunate enough to appear, albeit in a very junior capacity.

One of Sir Michael's many gifts was his ability to explain in ordinary language to the 12 ordinary men and women who were somewhat mystified to find themselves being plucked from the Old Bailey and deposited in the Royal Courts of Justice, why they were there, and the often difficult matters, both of fact and law, that they had to decide. This was no mean feat, something I understand much better now I am a judge, than when I was at the Bar.

Sir Michael retired as a High Court judge in 1991. Since then, there have been many improvements in the way in which expert evidence is prepared and presented in civil litigation, supported of course by the work of this excellent institute.

The judge will have the reports in writing. There might also be only one court appointed expert, in which case the task for the judge is even more straightforward.

If the civil procedure rules have been complied with, the experts will have exchanged views, and set out in a list the areas of agreement and disagreement. At the trial itself, the judge who has always been able to take a full note of the evidence, can elucidate any answers given by further questions.

The judge now also has the power to direct that some or all of the experts from the same disciplines shall give their evidence concurrently (an adaption of the Australian practice known colloquially as "Hot Tubbing"). The current practice direction

(Practice Direction 35.11) introduced as the result of a recommendation made by Lord Justice Jackson in the Costs Review Final Report states that:

“The judge may initiate the discussion by asking the experts, in turn, for their views. Once an expert has expressed a view the judge may ask questions about it. At one or more appropriate stages when questioning a particular expert, the judge may invite the other expert to comment or to ask that expert’s own questions of the first expert”.

The process remains adversarial rather than inquisitorial however. After the judge has done all this, the parties’ representatives may ask questions of the experts, albeit the rules firmly discourage the covering of ground already explored.

The Australian experience, and some limited anecdotal evidence on the use of the procedure, referred to by Lord Justice Jackson, in a recent lecture³ suggests not only that concurrent evidence can help to save costs, but that it improves the quality of the evidence itself.

No system is ever perfect, and we mustn’t be complacent.

However, the system now in place in civil litigation, helps the experts and the lawyers to isolate the points in dispute and therefore to present their case clearly; it helps the judge to understand and assess the evidence, and ultimately we hope, it assists in a just and fair resolution of the dispute which has brought the parties before the court.

What then of criminal trials, where the decisions are taken by juries?

Of the components which we know are essential to the robust presentation of forensic evidence in criminal trials, let me focus on one: the need for expert evidence to be explained to the jury (and to the judge) so an appropriate assessment of it can take place.

³ Lecture by Lord Justice Jackson at the London Conference of the Commercial Bar Association of Victoria, 29 June 2016.

That is not to place this one component above others that are vital to the integrity of expert evidence. The science itself must be sound; and the experts must conform to rigorous standards in relation to every aspect of the way they deal with it.

These requirements for rigour are often the forefront of discussions by the Courts because of the discernible effect the failure to observe the highest standards in relation to such matters can have on the fairness of the trial.

The problem associated with a lack of understanding by the jury is, however, I would suggest more difficult to confront. Juries, unlike judges, do not give reasons for their decision; and whilst the Criminal Division of the Court of Appeal, can look at the judge's summing up, so at least his or her homework can be checked, they cannot look into the minds of the jury.

The answer however is not to do away with juries.

One of our finest advocates of the 20th century, Lord Alexander of Weedon QC said that nothing in our law is more fundamental than the doing of justice in serious criminal cases. He said:

“It is vital to victims of crime, to defendants, and to the confidence of society in our laws. But we do not entrust this task to trained professional judges. Instead we ask twelve ordinary men and women, chosen at random, with widely varying intellects, education, interests and prejudices, all of whom are wholly untrained in the law, to undertake the awesome responsibility of deciding guilt and innocence. Jurors can give no reasons for their decisions, and they cannot talk afterwards about what took place as they discussed their verdict in the jury room. They are amateurs to the legal process, and inevitably they are sometimes fallible.

Yet for approaching eight hundred years we have favoured this system of justice. It is deeply embedded in our national psyche as a protection against unjust convictions or the pressures of an over-mighty state. Oliver Wendell Holmes, the great American

jurist, said of trial by jury that it 'keeps the administration of the law in accord with the wishes and feelings of the community'."4

Learned Hand would have agreed. The solution to the problem he thought was not to do away with the jury that "palladium of our liberties" as he described it.

I would add that the continued use of juries is as much an article of faith, in America as it has been here. Indeed, one of the grievances in the Declaration of Independence was that King George III had deprived the colonies "in many cases of the benefit of trial by jury".

So Learned Hand asked himself what it was the jury needed to help them choose.

He thought it was a board of experts, or a single expert not called by either side, to advise the jury of "generally true propositions", as he called them.⁵

In fact, the use of assessors had by then already been mooted, but rejected on this side of the Atlantic, where there had been a vigorous debate towards the end of the 19th century, when specialist tribunals were emerging, about the use of technical experts to assist in business cases.

What the jury needs, to help them choose when the scientists disagree, remains however a vital question. The science may be as robust as you like, the standards of probity of the experts may be beyond reproach, but it will be of little use, if the product of such excellence then sails (metaphorically speaking) over the jury's head.

Even someone as learned as Learned Hand - a marvellous name for those who believe in nominative determinism - could not have predicted the scientific developments of the recent past or the complex expert evidence they have made possible, and which is heard almost as a matter of routine in the criminal courts.

⁴ Foreword, *The Juryman's Tale*.

⁵ "A deliverance to them by some assisting judicial body of those general truths, applicable to the issue, which they may treat as final and decisive. Theirs is, and in the nature of things cannot be, the function to decide between two sets of truths; they want that general rule on which they can rely, and that given, they can use it as they use other rules of inference."

Some have expressed concern about the so-called CSI effect: the unrealistic expectations of what forensic science can do, engendered by television programmes, watched by millions, where infallible science provides the solution to every crime.

Science fiction might also influence our view of the world. I am doubtful whether anyone really believes that the Star Ship Enterprise's "Warp Factor" trumps the theory of relativity, but it is true to say that the pace of progress, which seems to transform science fiction into science fact, can be somewhat unnerving (today after all is the day when Juno has entered the orbit of Jupiter, a planet that is 360 million miles from Earth at its nearest point).

While it is important to be aware of the risk that popular culture may affect our perception of what science can and cannot do, its potential to influence the legal process should not be overstated. Juries have a remarkable ability to focus on the evidence presented in the courtroom, as anyone who has seen the keen attention they pay to the presentation of forensic evidence will tell you.

I think the real problem which requires our attention is two-fold. First, the pace of scientific development has increased the gap that exists between ordinary understanding and science. To state the obvious, people live in an increasingly sophisticated world, without understanding some of the most basic scientific concepts which are integral to the way in which they live their lives. And there is an increasing reliance on experts to fill the gap. Secondly, as the science has become more complex, it has become more difficult for all those involved in the legal process to understand it and to assess it. I do not find it surprising that there is some evidence that juries can find it difficult to understand or follow cross-examination aimed at revealing flaws in scientific methodology, or then to determine how much weight to attach to it. This in turn gives rise to an obvious risk that the resolution of an issue in dispute will simply involve deference to the opinion of a convincing expert.

The Royal Statistical Society has been very concerned about this information or understanding gap, and not just on the part of juries. Its guidance for assessing the probative value of DNA evidence is directed at judges, lawyers, forensic scientists and expert witnesses.⁶ It says, correctly, that statistical evidence and “probabilistic” reasoning play an important and expanding role in criminal investigation prosecution and trial, not least in relation to forensic scientific evidence, including DNA, produced by expert witnesses. And that it is vital that everyone involved is able to comprehend and deal with probability and statistics appropriately. It points to the long history of “misunderstandings” relating to statistical information, which have contributed to serious miscarriages of justice. It says rightly that criminal adjudication in this jurisdiction is strongly wedded to the principle of lay fact finding by juries employing their ordinary common sense reasoning. And with a touch of understatement and diplomacy perhaps, then says this:

“Notwithstanding the unquestionable merits of lay involvement in criminal trials, it cannot be assumed that jurors or lay magistrates will have been equipped by their general education to cope with the forensic demands of statistics or probabilistic reasoning. This predictable deficit underscores the responsibilities of judges and lawyers within the broader framework of adversarial litigation, to ensure that statistical evidence and probabilities are presented to the fact finder in as clear and comprehensible a fashion as possible. Yet legal professionals’ grasp of statistics and probability may in reality be little better than the average juror’s. Perhaps somewhat more surprisingly, even expert witnesses, whose evidence is typically the immediate source of statistics and probabilities presented in court, may also lack familiarity with relevant terminology, concepts and methods...it does not follow from the fact that the witness is a properly qualified expert in say fingerprinting, or ballistics or paediatric medicine”.

In some respects, of course many will have benefited from the “popularisation” of science at some level. But there is a distinction between popular science and accurate science, as many have pointed out.

⁶ The Royal Statistical Society, Practitioner Guide 2: ‘Communicating and Interpreting Statistical Evidence in the Administration of Criminal Justice: Assessing the Probative Value of DNA evidence’, March 2012.

It is one thing to have heard about String Theory or the Higgs boson particle or Fermat's Last Theorem. It is quite another to understand the statistical probabilities relevant to DNA evidence, as juries are routinely invited to do.

This can cause difficulties, and not just for juries. The prosecutor's fallacy in relation to DNA evidence is a case in point. This confuses the probability of the evidence arising given the assumption of guilt, with the probability of guilt given the evidence. Many of you will be familiar with it, but for the benefit of those who are not, I hope you will forgive me for repeating what was said about it, by the Court of Appeal, Criminal Division:⁷

"It is easy, if one eschews rigorous analysis, to draw the following conclusion:

1. Only one person in a million will have a DNA profile which matches that of the crime stain.
2. The defendant has a DNA profile which matches the crime stain.
3. Ergo there is a million to one probability that the defendant left the crime stain and is guilty of the crime.

Such reasoning has been commended to juries in a number of cases by prosecuting counsel, by judges and sometimes by expert witnesses. It is fallacious and it has earned the title of "The Prosecutor's Fallacy". ...

Taking our example, the prosecutor's fallacy can be simply demonstrated. If one person in a million has a DNA profile which matches that obtained from the crime stain, then the suspect will be 1 of perhaps 26 men in the United Kingdom who share that characteristic. If no fact is known about the Defendant, other than that he was in the United Kingdom at the time of the crime the DNA evidence tells us no more than that there is a statistical probability that he was the criminal of 1 in 26.

The significance of the DNA evidence will depend critically upon what else is known about the suspect. If he has a convincing alibi at the other end of England at the time of the crime, it will appear highly improbable that he can have been responsible for the crime, despite his matching DNA profile. If, however, he was near the scene of the

⁷ In *R v. Doheny and Adams* [1997] 1 Cr. App. R. 369.

crime when it was committed, or has been identified as a suspect because of other evidence which suggests that he may have been responsible for the crime, the DNA evidence becomes very significant. The possibility that two of the only 26 men in the United Kingdom with the matching DNA should have been in the vicinity of the crime will seem almost incredible and a comparatively slight nexus between the defendant and the crime, independent of the DNA, is likely to suffice to present an overall picture to the jury that satisfies them of the defendant's guilt.

The reality is that, provided there is no reason to doubt either the matching data or the statistical conclusion based upon it, the random occurrence ratio deduced from the DNA evidence, when combined with sufficient additional evidence to give it significance, is highly probative. As the art of analysis progresses, it is likely to become more so, and the stage may be reached when a match will be so comprehensive that it will be possible to construct a DNA profile that is unique and which proves the guilt of the defendant without any other evidence. So far as we are aware that stage has not yet been reached.”

The criminal justice system, and those who give expert scientific evidence in the courts are therefore presented with a considerable challenge. And when things go wrong this is not only a matter of concern to the defendant, as the Lord Chief Justice, Lord Thomas, explained when addressing the Criminal Bar Association in October 2014:

“Scientifically rigorous but accessible forensic science matters to the criminal justice system as a whole, which is the “customer” for forensic evidence. It matters to ...the members of the criminal bar who rely on expert evidence whether representing the defence or prosecution to represent properly [the] client. It matters to the judiciary in ensuring fairness of proceedings, directing the jury, and upholding the rule of law. And it matters to society more generally, in ensuring that the innocent are not convicted of crimes they did not commit and that the perpetrators of serious crimes are brought to justice.

The court must be satisfied that there is a sufficiently reliable scientific basis for the evidence to be admitted – how can it meet the challenge?

Perhaps the most obvious point ...is the risk of a miscarriage of justice if the forensic science is wrong, or the expert presents or interprets it incorrectly, or indeed if the expert is deliberately misleading.

But however eminent and reliable the expert, the presentation of forensic evidence is rarely black and white. With increasingly complex or novel science there comes the risk of testing the science, rather than the evidence, in front of the jury. This in turn risks undermining juries' and public confidence in forensic science with highly undesirable consequences, resulting either in less use of forensic evidence, or less use of juries. So there is a challenge for all of us ...to manage the presentation and testing of forensic evidence in such a way as to avoid fatally undermining confidence.”⁸

What then are the options?

On statistics specifically, the Royal Statistical Society concluded it would be sensible for there to be an authoritative practitioner guidance produced in collaboration with the professions, which could form a central part of professional education.

It also identified the US Federal Judicial Center's Reference Manual on Scientific Evidence, as a valuable and instructive template. This document “written with the needs of a legal (primarily judicial) audience in mind, covers a range of topics including: data collection, data presentation, base rates, comparisons, inference association and causation, multiple regression, survey research, epidemiology and DNA evidence.”

I have already mentioned the assistance that judges are given in civil litigation.

In the Patents Court, although I understand it is rare for this to happen, the Judge can sit with a Scientific Advisor or assessor a wholly independent expert, who has to assist (perhaps more accurately educate) the judge on any general issue without expressing views as to an appropriate outcome; and the Patents Court can appoint a

⁸ The Right Hon. The Lord Thomas of Cwmgiedd, Lord Chief Justice of England and Wales: The 2014 Criminal Bar Association Kalisher Lecture: “Expert Evidence: The Future of Forensic Science in Criminal Trials”.

technically qualified person from the UK Intellectual Property Office to give the judge what amounts to a pre-match technical tutorial.

Neither option would really be feasible for juries.

Of more interest however, is the express encouragement given to the parties in Patents cases to produce a technical primer setting out the agreed basic undisputed technology relevant to the case. The relevant rules of court provide that this should be produced in advance of the expert reports to avoid substantially the same material being described by each expert. Ideally primers should be agreed documents. Generally, where the parties are not able to agree whether to include a particular issue ought to be included in the primer, rather than having a “marked-up” primer showing the areas of dispute, the issue should be omitted and dealt with by the experts in their reports. Where a technical primer has been produced, the parties are told they should identify those parts which are agreed to form part of the common general knowledge.⁹

Lord Thomas (in his 2014 address) said he thought this was a fruitful avenue to explore in the criminal context. So did Sir Brian Leveson. In his “Review of Efficiency in Criminal Proceedings” in January 2015 he said:

“Juries cannot and should not be expected to understand and interpret complex scientific concepts. This is important for several reasons, but certainly in order to avoid unnecessary use of limited court resources, and in order to prevent juries reaching perverse decisions which might contribute to a loss of confidence not only in specific scientific areas but more fundamentally in the system of trial by jury. This is not to say that opposing scientific views should not be placed before the jury. Instead, this should be restricted to only those circumstances where it genuinely is an issue, and efforts made to minimise the number of contentious scientific questions in relation to which a jury is asked to make a decision. It is rare to have a case where a large part of the complex technical or scientific evidence is not common ground.”¹⁰

⁹ The Patents Court Guide, 2016, p.9.

¹⁰ The Rt. Hon. Sir Brian Leveson, ‘Review of Efficiency in Criminal Proceedings’, (2015), p.63.

Sir Brian made two recommendations. First, that the courts should use their powers which they have under the criminal procedure rules, more frequently than they have done up till now, to direct that experts identify at an early stage, the issues on which they agree, and those they do not, and to prepare a joint statement – as is par for the course in civil proceedings.

And secondly, that a series of ‘primer’ documents, relating to the most popular areas of forensic science, should be prepared, presenting the science in an accessible, plain English format. The ‘primers’ would however be restricted to the areas on which there is consensus amongst the scientific community and would assist juries in understanding the concepts underpinning the issues in their case.

He also expressed firm support for the development of suitable mechanisms whether in the form of ‘primer’ documents or electronic presentation aids relating to the most common forms of forensic evidence, with the caveat that the impact of the fairness of the use of such forms of presentation, should be the subject of proper research.

To bring matters right up to date, the recommendations made are about to come to fruition. A number of short guides or primers on selected scientific topics, of relevance in civil and criminal litigation, will be produced in the near future for the benefit of the judiciary and practitioners alike, as a result of a project, initiated by the Lord Chief Justice, in conjunction with The Royal Society and the Royal Society of Edinburgh.

The guides will be designed to be understood by an intelligent amateur (I take that to mean the judge); and they will provide an overview of the state of science in topics selected by a commissioning board chaired by Lord Hughes. It is expected that the guides (i) will set out what science can establish in the topic under consideration and what it cannot; and (ii) will identify anticipated advances and issues at the “cutting edge” of scientific knowledge.

It is certainly hoped judges will be encouraged in their role as “gate keepers” to exclude evidence where there is no proper scientific basis for its admission. The process is a collaborative one, involving at various levels, the judiciary, scientists,

lawyers, academics, researchers and the professions. The guides will be written by scientists under the guidance of the board as to the particular issues that need to be addressed, and they will be subject to a system of peer review. The two areas of scientific endeavor under consideration at the moment, are gait analysis and DNA. The publication of the first guide (on DNA) is expected to take place by Easter 2017.

It will be interesting to see how this work will be supported by the work and research that is now to be done at the Leverhulme Centre for Forensic Science, the Centre led by Professor Sue Black, which is opening tomorrow at the University of Dundee. Professor Black has identified “research gaps” in a range of evidence, from fingerprinting to DNA analysis, and, in addition, the need to raise the bar in the standards of science underpinning such techniques in order to restore public and judicial confidence in forensic science.

It is not currently intended these guides should be given to the jury but there can be no doubt at all, that they will be of considerable help to them. Much sand is capable of being kicked up in the courtroom; and this has the effect, whether deliberate or otherwise, of obscuring the points that the jury needs to focus on. Understanding the science on the part of advocates and judges leads to greater clarity, as does the identification and isolation of the matters that are really in issue. Normally, in the context of expert evidence, the points of true controversy are few in number. And the minds of the judge, and the jury should be concentrated on the points of division, and nothing else.

Learned Hand thought juries needed “generally true propositions” to help them. I agree, and it is to be hoped that these guides will provide them.

We are all conscious that what is certain science today, may not be so tomorrow. The Lord Chief Justice’s nominated representative on the Forensic Science Advisory Council – a judge who does not have a scientific background - said he was in the same position as many other judges and almost all juries when having to evaluate disputed scientific evidence.

“Most non-scientists see scientific evidence as providing a rock of certainty in a choppy sea of conflicting and frequently mendacious eye-witness evidence. One has to learn that it can sometimes be an illusion. Scientific facts may not lie or forget they have to depend ultimately on probabilities.”¹¹

But this does not diminish the responsibility we have to help the jury through those choppy waters today.

Marcus du Sautoy, the Professor in the Public Understanding of Science at the University of Oxford, said: “For me, science is about discovery but it is also about communication. A scientific discovery barely exists until it is communicated and brought to life in the minds of others”.¹²

In 1938, in his paper “On the Effects of External Sensory Input on Time Dilution” Einstein wrote:

“When a man sits with a pretty girl for an hour it seems like a minute. But let him sit on a hot stove for a minute and it’s longer than any hour. That’s relativity.”

In relative terms, I have kept you on the hot stove for long enough.

Thank you.

Victoria Sharp

6 July 2016

¹¹ HH Judge Goymer, ‘The Importance of Forensic Science to the Courts’, Forensic Science Regulator’s Conference, 2014.

¹² Oxford Mathematical Institute Newsletter, Spring 2009, Number 7.