

## AUTHOR'S PRE-PRINT

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### REVIEW

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*Paul Roberts, Michael Stockdale* (Eds.), **Forensic Science Evidence and Expert Witness Testimony: Reliability Through Reform?** Cheltenham: Edward Elgar Publishing, 2018, xxii + 431 pp, hb £ 120.00. [eBook version from £22/\$31]

If forensic science and expert witness testimony were areas where everything just worked fine, then there would be no need for this book. Unfortunately, the reality is different. The usage of science in legal proceedings is affected by continuing struggles and intricate systemic problems. In her most recent annual report, released in March 2019, the UK forensic science regulator Dr. Gillian Tully concisely summarises the current situation as follows: “It is my view that profound changes to funding and governance are required to ensure that forensic science survives and begins to flourish rather than lurching from crisis to crisis.” (Annual Report 17 November 2017 – 16 November 2018, at p. 3)

But what exactly is forensic science? Forensic science is a topic difficult to grasp. On the one hand, it is an academic branch, though rather heterogenous in nature. Unlike traditional disciplines such as the law, economics and ‘hard’ sciences such as physics and chemistry, the academic landscape of forensic science research and education occupies niche positions. Often, its focus is influenced by local organisational structures of higher education through affiliations to departments of physics, chemistry or engineering. This may pose obstacles to the development of forensic science as an interdisciplinary field. On the other hand, forensic science is a discipline strongly rooted in legal practice, with applications at all stages in the legal process, from investigation to evidence and proof processes at trial. In the latter dimensions, forensic science output is shaping inference and decision-making processes of investigators, magistrates and fact finders, and has the potential to affect the fate of the lives of citizens in most penetrating ways. At any one time, there are millions of criminal proceedings let alone across Europe every year, it is disconcerting, however, to see that the media, academics and specially appointed scientific commissions prominently expose forensic science – at regular intervals – as a cause of concern, lacking the credentials that one commonly thinks it should have. Recognising both the crucial role that forensic science plays in modern criminal proceedings across different legal systems and the strongly interdisciplinary roots of forensic science, *Forensic Science Evidence and Expert Witness Testimony: Reliability Through Reform?* addresses two themes, evidential reliability and institutional reform. These themes are used as lenses through which the authors examine the practical and theoretical challenges that derive from problematic and faulty forensic science.

On the editorial side, this volume emerges from the collaboration of two outstanding scholars, Professors Paul Roberts (Professor of Criminal Jurisprudence, Faculty of Social Sciences, University of Nottingham, UK) and Michael Stockdale (Head of Law and Director of the Northumbria Centre for Evidence and Criminal Justice Studies, Northumbria University, Newcastle, UK). They foster exchanges through the Northumbria Centre for Evidence & Criminal Justice Studies (NCECJS), which is part of Northumbria Law School. Jointly, the Editors gathered a global group of 18 contributors in total (from the UK, Ireland, Switzerland, Malaysia, Australia, Canada and the US). They are all recognised experts in their fields which include the law, forensic science, regulation and policy-making. The volume features 13 chapters that, individually and collectively, demonstrate a rigorously interdisciplinary and international perspective.

The common focus of inquiry of all chapters starts from the observation that forensic science as applied, by and large, *cannot* currently be trusted by default. Instead, it requires constant scrutiny and challenge at different levels, i.e. in its individual application (in particular cases), as an academic branch of research and teaching, and as a professional area of activity, be it provided commercially or by governmental institutions. With regard to this starting point, the volume seeks to tackle two main issues. The first is the clarification of how to understand the notion of reliability in forensic science. The second is whether, and if so how, reliability thus defined may be strengthened through institutional reform and regulation.

At this juncture, the sceptical reader may ask how reliability could represent a fundamental problem, given that forensic science strongly relies on established sciences such as biology, physics and chemistry. This question is worthy of address before discussing the topics approached in the various chapters of this book. A rough but effective answer is that forensic science, although relying on methods and techniques borrowed from the so-called ‘established sciences’, is in many ways radically different from those sciences. A few considerations help to illustrate what is meant here. For example, while traditional experimental sciences such as physics and chemistry are typically thought of as operating under clean and sterile laboratory conditions, using ‘pure’ substances at the outset, forensic science does not have the privilege of choosing its initial conditions. Most often, traces must be searched, found, secured and successfully transferred to a laboratory before a systematic and methodologically well-defined sequence of examinations can even begin. What is more, collected material that actually made its way into the laboratory may be partial, degraded and/or be a mixture of different trace matter from multiple sources as a result of exposure to a complex set of environmental factors (e.g. weather, activities of intervening rescue personnel, fire, etc.) or failures in the chain of custody. Carr et al. thus rightly note that, for the example of fingermarks, “[t]he quality of recovered marks is affected by numerous uncontrollable variables (...)” (p. 170) and that hence reliability is, among other factors, “(...) determined by the quality and quantity of detail in the mark.” (p. 170) As yet another constraint, recovered material may be so limited that only a single, non-replicable analysis may be performed. Clearly, this is different in traditional sciences where analysts may conduct multiple experiments, fine-tune methodologies, or even delay analyses until further research suggests new solutions. But the use of science in the legal process does not have the liberty of delaying examination: it must proceed with the best knowledge available, and cope with the evidence as it is, however imperfect it may be. At the same time, the current fragmentation of forensic science examination and evaluation processes over different institutional bodies and service providers implies a host of critical intersections where errors may occur.

The considerations raised above represent some of the reasons why the study of reliability in forensic science requires a multidimensional and interdisciplinary perspective. Professor Roberts, in his opening Chapter, poses a systematic and rigorous diagnosis by providing and discussing a list of “top 20 issues, problems and criticisms of forensic science” (p. 33). This initial diagnosis is valuable because it provides a broad opening perspective that helps the reader understand where exactly subsequent chapters make their contributions. Chapter 2 by Professor Gary Edmond offers a detailed review and discussion of recent literature that critically examines the extent to which many common forensic science applications can be trusted. More specific investigations of reliability in selected domains are provided by Carr et al. for DNA and fingerprints (in Chapter 5) and by Wilson et al. for forensic pathology evidence (in Chapter 6). Chapter 3 by Professor Tony Ward examines the intricate relationship between reliability and admissibility in the context of common law principles, followed by an exposition of the regulatory perspective in Chapter 4 by the current Forensic Science Regulator in the UK (Gillian Tully), and an investigation of the question of reliability by procedural rule reform in Chapter 7, by Professor Michael Stockdale. Subsequent chapters provide international perspectives from Ireland (Chapter 8, Professor Liz Heffernan), the US (Chapter 9, Professor Edward J Imwinkelried), Canada (Chapter 10, Professor Emma Cunliff), Malaysia (Chapter 11, Professor Salim Farrar and Mohd Munzil Muhamad) and Continental Europe (Switzerland, Chapter 12, Professor Joëlle Vuille). The last chapter, 13 (Professor Carole McCartney and Rick Graham), critically exposes and discusses the challenges associated with transnational scientific evidence.

With regard to the core question of the book, ‘Reliability through reform?’, the various chapters provide a rich scope of avenues through which current forensic science practice in legal proceedings may be strengthened and placed on firmer grounds, though – as acknowledged by Professor Roberts – “(...) the essays do not speak with a single, unified voice nor do they offer comprehensive solutions to clearly defined problems” (p. 25). Overall, the authors call for increased awareness and scrutiny of forensic science reliability on all systemic and institutional levels: the ‘producers’ of forensic science services, recipients of expert evidence, legislators, regulators and policy-makers. The authors’ arguments and calls are well justified and agreeable, but some of the topical issues they raise – though unresolved – rest on rather mainstream arguments.

One example for this is the notion of ‘error rates’, mentioned in several chapters. This notion is often accompanied with the call for a suitable assessment of said ‘error rates’, on an empirical basis (e.g. Edmond, p. 102). Historically, the notion of error has troubled forensic scientists at least since the early years of modern forensic DNA analysis around the 1990s, though it also is a vexing topic in many other forensic science disciplines, such as handwriting examinations and fingerprints. But as widespread as the call for error rate assessment is both in scholarship and practice, the notion of ‘rate’ remains undefined: is it the rate pertaining to a particular profession, a given laboratory or a given examiner? As a concept, it seems self-defeating, because a general rate may be too unspecific whereas a rate for a given examiner may be too hard to elicit. Seen from the perspective of the most vulnerable participant in the criminal processes (i.e. defendant), a case-specific assessment of the *potential* (or, probability) of error would be most valuable: i.e. the question of how to assess the probability for the event of an error in the case of interest. But clearly, this would no longer be a frequentist concept of rate, defined across a collection of unspecified cases, but tailored to the circumstances of the case

at hand. Indeed, as noted by McCartney and Graham, “(...) the inherently contextual nature of forensic science evidence” (p. 392) needs to be observed. What is more, even if one could come up with a defensible assessment of the potential or rate of error, it is no way clear what exactly one ought to do with it – besides informing debates about admissibility. Wider forensic science literature, for example, remains unanimous as to whether probabilities for error should be reported separately or incorporated in value of evidence assessments. There is also disagreement on how to actually summarise and present data on errors in a sensible way other than by merely aggregating standard notions of rates of false positives and negatives. Again, note that an error ‘rate’ does *not* directly represent the potential or probability of error in a given case at hand, though may inform it. Professor Edmond suggests that advice and assistance should come “from those with pertinent technical expertise, especially mainstream scientists and experimental psychologists” (p. 104). But given the reigning confusion on this topic in the current state-of-the-art, it remains fundamentally unclear how recipients of expert information could expect assistance in these matters.

The intention here is not to suggest that the book should have offered a solution to the above contentious topic – which would be an unfair expectation, given the controversial and intricate nature of the problem. However, the book could have made more pressing and forceful calls for concrete actions. As a point of comparison, notice that many other areas of human activity that potentially touch directly on the integrity of citizens (e.g. health care, aerial traffic) pursue more open and proactive approaches to the study and monitoring of errors. It is difficult to see, thus, why forensic science could not at least show comparable levels and efforts of scrutiny and commitment.

These critical comments do not adversely affect the overall quality of this book. Quite to the contrary, they merely show that the book raises highly relevant points. Most any specialist reader will discover material in this book that they will find thought-provoking and far-reaching. Generalist readers, strategic analysts, regulators and policy-makers, future and aspiring forensic scientist newly entering the field, lawyers and legal scholars who seek access to a difficult but fundamental topic should consider this book as a primary, authoritative and up-to-date reference.

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