NOTE: This was the draft of W Twining,. Preface to David Schum, Los fundamentos probatorios del razonamiento probabilistico, .translation (Orion Vargas V.), Evidential Foundations of Probabilistic Reasoning, , Bogota, Colombia, 2016, pp.xi-xvii, the Spanish translation of David Schum, *Probabilistic Foundations of Evidential Reasoning* (1994/ 2001) .

PREFACE

"The field of evidence is no other than the field of knowledge" (Jeremy Bentham)

"Have you ever given any attention to the Science of Evidence?" said Mr Grodman.

"How do you mean?", asked the Home Secretary, rather puzzled, but with a melancholy smile. "I should hardly speak of it as a science. I look at it as common sense".

"Pardon me, sir. It is the most difficult of all the sciences. It is indeed rather the science of sciences. What is the whole of inductive logic, as laid down (say) by Bacon and Mill, but an attempt to appraise the value of evidence, the said evidence being in the trails left by the Creator, so to speak? The Creator has (I say it in all reverence) drawn a myriad of red herrings across the track. But the true scientist refuses to be baffled by superficial appearances in detecting the secrets of Nature." (Israel Zangwill)

All human beings draw inferences from evidence every day of their lives. We hear about evidence and inference on television, in the press and on Facebook. In the public sphere evidence is an indispensable element of restricting nuclear proliferation, investigating genocide, in military intelligence, medical diagjnosis, in the administration of justice, and in decisions by politicians, judges, engineers and many others. Evidence-based medicine and evidence-based policy are now fashionable in many countries. And, of course, evidence is at the centre of nearly all scientific and humanistic disciplines.

At an abstract level there is an immense theoretical literature about evidence __ for example, in epistemology, ontology, logic,

mathematics, and statistics. In theology, proof of the existence of God has been a contested issue through the ages. Yet there has been much less work at more concrete levels on drawing out what is common and what is special about practical inferential reasoning in different contexts and enquiries. A major exception to this has been the work of David Schum who for most of his long career has been studying the properties, uses, discovery and marshaling of evidence in probabilistic reasoning in a wide range of contexts and disciplines. *Evidential Foundations of Probabilistic Reasoning* (hereafter *Foundations*) was first published in 1994. It is Schum's *magnum opus*, but it was preceded and succeeded by many other publications. The purpose of this Preface is to set this classic work in a wider context and to draw attention to some of Schum's important work since 1994.

David Schum was born in Chicago in 1930. He obtained the BA and MA degrees biology and psychology from Southern Methodist University and a PhD degree (1964) from Ohio State University. His early work was mainly in Psychology and Statistics, but over time he transcended many disciplines both in theory and practice. His present post is Professor of Systems Engineering and Law at George Mason University, but he has also been associated with a Medical Faculty, several law schools, and, as Honorary Professor of Evidence Science, at University College London. He has long been involved in training intelligence analysts for the American security services. An early work, *Evidence and Inference for the Intelligence Analyst* (1987), is a model of clarity. Although intended as a simple introduction, it was published in two large volumes which unnecessarily made it appear formidable and inaccessible. It sank almost without trace. It is still worth consulting. In addition to his extraordinary breadth of knowledge across disciplines

Schum is also renowned for his concern for the practical application of his ideas in many different contexts.

Quite early in his enquiries David Schum came across a copy of the 1937 of John Henry *Wigmore's Science of Judicial Proof: As Given in Logic, Psychology and General Experience* Significantly, the first two editions had been called *Principles of Judicial Proof* and the substitution of *Science* for *Principles* was made on the insistence of the publisher. Wigmore is the most famous scholar of the Law of Evidence in the history of the Common Law, but his *Principles of Proof*, addressed to practising attorneys, was not taken seriously and was largely ignored. Wigmore's aim was to advance a systematic way of constructing arguments based on masses of evidence in complex legal cases. Schum immediately recognized not only that Wigmore's enterprise was very similar to his own but that he was in some important respects a kindred spirit. For example, the passage from Zangwill quoted above was a favourite of both of them and caught the essence of their shared concerns. Schum also realized that Wigmore was years ahead of his time. Shortly after the publication of *Foundations*, Schum co-authored with Joseph Kadane, a Professor of Statistics at Carnegie Mellon University, a book-length study of the evidence in one American *cause célèbre*, the Sacco-Vanzetti case, inter alia applying and refining Wigmore's 'chart method'.

Wigmore became one of Schum's main sources of inspiration. Schum built on him, clarified his terminology and brought his own breadth of knowledge beyond law to bear on Wigmore's approach, linking it to both psychology and probability theory. As it happened, Schum's discovery of Wigmore roughly coincided with a revival of interest in theoretical aspects of evidence in legal contexts both in the United

States and Britain. Stimulated largely by the misuse of statistics in the California case of *People v Collins* (1968) a lively debate developed in North America about the use of probabilities in judicial decision-making. Most of this debate centered round different theories of mathematical probability. However, Jonathan Cohen, an English philosopher interested in inductive logic, argued that for fact-finding in legal contexts the proper model was not mathematical ('Pascalian') reasoning about probabilities but rather non-mathematical inductivist ('Baconian') reasoning. Cohen's work produced a storm of controversy in both legal and psychological circles. The debate still continues. Interestingly English jurists tend to favour the Baconian approach, whereas in America the debate has been mainly between Bayesians, frequentists and other 'Pascalians'. Schum manages to accommodate both approaches.

In the early 1970s a third stream of revived interest developed. Around 1970 I took up evidence as a special interest, partly influenced by Jeremy Bentham (who had argued that all formal legal rules of evidence should be abolished) and partly by the American Realist, Jerome Frank, who emphasized the importance of fact-finding in adjudication and legal practice. Like Schum, I soon discovered Wigmore's *Principles* and decided that his 'chart method' could be modified as a useful heuristic for training law students how to construct and criticize arguments on questions of fact. Quite independently, Terence Anderson of the University of Miami Law School started to use Wigmorean analysis in his courses on evidence. Schum, Anderson and I first developed our ideas in this area sepratel from each other until the early 1980s. In 1981 I joined forces with Anderson and I first came across two articles by Schum about the same time. Eventually all three of us got together and

started a professional relationship and friendship which has lasted ever since. Often the late Peter Tillers was a fourth member of the group. He and Schum collaborated on an important empirical study of fact-investigation, which clearly showed the wide application of Wigmorean analysis beyond adjudication. Anderson and I collaborated on a book designed primarily for law students on *Analysis of Evidence* (first published edition 1991). This was based in part on a modified Wigmorean approach. Later we invited Dave to become a co-author for the second edition, which was published in 2005.

In 1994 Anderson and I were invited to the Netherlands Institute of Advanced Study (NIAS) to join an interdisciplinary team that was studying 'forensic expertise' in the Netherlands Criminal Justice System. In addition to our main project we formed a multi-disciplinary group of social scientists, historians and other humanists and threw down the following challenge:

"Notwithstanding differences in (i) the objectives of our particular enquiries; (ii) the nature and extent of the available source material; (iii) the culture of our respective disciplines (including its history, conventions, state of development etc.); (iv) national backgrounds; (v) other contextual factors, all of our projects involve, as part of the enterprise, drawing inferences from evidence to test hypotheses and justify conclusions and that the logic of this kind of enquiry is governed by the same principles."

After a number of seminars and other events we invited David Schum to join us and to write the introductory chapter in the volume we were

planning. Entitled "Evidence and Inference about Past Events: an Overview of Six Case Studies", this paper extended Schum's range to Theatre Iconography, Assyriology, Musicology, Economic History, History of Political Thought, and the use of love letters as crucial evidence in a murder trial. He navigated these different essays with aplomb and presented an early version of his 'substance-blind approach' to the science of evidence which he further developed in a major multi-disciplinary programme at University College London (UCL) (2004-08). This culminated in an edited volume, *Evidence, Inference and Enquiry*, published by the British Academy in 2011. David Schum's *Foundations* was the starting-point of this ambitious programme, he was a leading participant and he contributed a chapter on 'Classifying Forms and Combinations of Evidence: Necessary in a Science of Evidence". In the abstract to his paper he provided a brief summary of his approach 'to an integrated science of evidence' as it stood in 2010, sixteen years after *Foundations* as follows:

"[E]vidence forms the foundation for inferential reasoning in any conceivable discipline, and there are three important credentials of all evidence: relevance, credibility and inferential (or probative) weight or force. The evidence classification scheme I developed I have referred to as being *substance-blind*, meaning that the classes of individual items of evidence I identify are recurrent and apply regardless of the substance or content of the evidence. There are also substance-blind combinations of evidence that are also recurrent."

At UCL Schum met some resistance to his general approach: some who were in general revolt against 'scientism' in their own fields, objected to the use of the term 'science' in this context; but Schum made it clear that he too was against exaggerated claims of 'scientism' (citing Haack

2007), but he was using 'science' in a relatively soft sense, that emphasizes classification. Personally I think that Wigmorean analysis is more art than science. Some others were resistant on the grounds that the very idea of 'evidence' is context-specific and in their own discipline(s) there are special types of data and modes of interpretation that are discipline-specific. In my view, none of them negated the generality of Schum's key concepts, but in some cases they may have raised some interesting questions about the idea of substance-blindness. Other objections seemed to rest on rather strong versions of the autonomy of disciplines. I think that Schum's 'substance-blind' approach survives these criticisms and that his later work has confirmed and only slightly refined the views he advanced in *Foundations*. He gives due regard to the particularities of context, and even to intellectual traditions and the culture of disciplines, but nevertheless he has presented some conceptual and other tools of very wide application. The greatest strength is that he shows how different disciplines can learn from each other. Certainly, Law has a lot to offer other disciplines in respect of concepts, methods and techniques for constructing arguments, but we can learn even more from our sister disciplines.

One disappointment to date has been that these projects have not attracted the attention of many scholars from the 'hard' sciences, who sometimes seem to think that 'evidence' is not problematic for them. Some medics participated in the UCL programme and Anderson and I have invaded the spheres of archeology and international criminal tribunals. Forensic science has recently received Wigmorean attention from Paul Roberts and others. But chemists, biologists and physics have stayed away. I would welcome the application of Schum's approach to

astronomy and forensic anthropology, for example. But so far the main attention has been on Law, and some of the Humanities and Social Sciences.

David Schum is a dedicated teacher who has earned the gratitude of many students across several disciplines. He is known for his enthusiasm, his clarity, his accessibility, and for the fact that he has taught many of them some useful skills of wide application. To end on a personal note: Anderson, Schum and I have visited each other's courses, stayed in each other's homes, and debated in private and public for over 30 years. Dave is one of my closest friends. He is warm, generous and good company. He is not always the best guardian of his own interests. For instance, he was not even aware for some months that *Foundations* had appeared in paperback. Over the years I have tried to persuade him that if he wishes to sell the film rights of *Foundations* to Hollywood he will have to allow them to change the title to *Proof*. That would be a good name for a movie.

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References on separate sheet.