# Analysis of Evidence

This is an enjoyable and rigorous introduction to the construction and criticism of arguments about questions of fact, and to the marshalling and evaluation of evidence at all stages of litigation. It covers the principles underlying the logic of proof; the uses and dangers of story-telling; standards for decision and the relationship between probabilities and proof; the chart method and other methods of analyzing and ordering evidence in fact-investigation, in preparing for trial, and in connection with other important decisions in legal processes and in criminal investigation and intelligence analysis. Most of the chapters in this new edition have been rewritten; the treatment of fact investigation, probabilities and narrative has been extended; and new examples and exercises have been added. Designed as a flexible tool for undergraduate and postgraduate courses on evidence and proof, students, practitioners and teachers alike will find this book challenging but rewarding.

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# Analysis of Evidence

## Second edition

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To our children and grandchildren
To Anne, Carolyn, and Penelope

# Contents: summary

# Contents

# Preface
## The why, what, and how of this book

### *The why*

Inferential reasoning, analyzing and weighing evidence, forming judgments about what has happened in the past or what is likely to happen in the future are a necessary part of coping with the problems of everyday living. They are basic human skills that form part of ordinary practical reasoning. Historians, detectives, doctors, engineers, and intelligence analysts have to develop and apply these skills with rigor and precision in specialized professional contexts. So do lawyers.

These skills have not traditionally formed part of professional training. Perhaps this is because they are perceived to be "mere common sense"; or because it has been felt that they can only be learned by practical experience "on the job"; or because of a belief that these are matters of "intuition" or that great lawyers or historians or detectives or diagnosticians are "born and not made."[1]

This book starts from a different premise. Building on the work of the American legal scholar John Henry Wigmore (1863–1943), we believe that skills in analyzing and marshaling evidence and in constructing, criticizing and evaluating arguments about disputed questions of fact are intellectual skills that can and should be taught effectively and efficiently in law schools. They are as essential a part of "legal method" as legal analysis and reasoning about questions of law. Common sense, intuition, and practical experience all have a part to play in exercising these skills, but they are not adequate substitutes for a systematic grounding in what Wigmore called "the principles of proof." This book is designed to enable students to lay a foundation and to develop the basic skills to a high degree before they enter practice as lawyers or in other spheres of activity that involve practical reasoning.

Between us we have accumulated more than fifty years of experience in teaching analysis of evidence in a variety of courses in several different countries. This book builds on that experience. It is designed as a flexible tool to lay a foundation for mastering a necessary set of basic intellectual and professional skills in fact analysis. They include techniques for structuring a problem and organizing a mass of data (macroscopic analysis) and techniques for detailed analysis and evaluation of

1 For a detailed account see *Rethinking* Ch. 2.

particular data and phases of complex arguments (microscopic analysis). Our main purpose is to present a vehicle for learning certain usable basic skills of analysis, argument, and practical problem-solving. The primary audience is law students, especially in courses on evidence and trial practice, but the early chapters and many of the examples can be used to learn about and develop skills of inferential reasoning in other contexts.

### *The what*

Chapter 1, "Evidence and inference: some food for thought," is a series of materials, cases, questions, and exercises. These are designed to achieve three objectives. First, to engage the interest of students and other readers, we have included some familiar and not so familiar examples illustrating the range of contexts in which inferential reasoning is necessary or useful. Second, we have provided examples that introduce concepts and issues that are developed in the remainder of the book so that readers can actively think about them from the outset. Third, these materials include concrete examples and exercises that are used as the basis for explaining and illustrating materials presented in later chapters. We have deliberately presented a wide variety of materials so that teachers can select which examples to use to introduce the subject and which can be studied later or omitted altogether. All of these examples have been used in the classroom, none of the authors use them all in one course, and each has his favorites. This is not a reading chapter; rather the idea is to encourage readers to engage actively with some concrete examples before moving on to the more abstract material that follows. Some teachers have used selected examples to illustrate concepts in subsequent chapters that students have been assigned to read later. Others may choose to recommend that their students begin by reading Chapters 2 and 3, referring back to particular examples as they appear in the text.

Chapter 2, "Fact investigation and the nature of evidence," introduces basic concepts and considerations that apply to evidence and inference across many contexts, with particular reference to the generation and testing of hypotheses in the process of any kind of factual investigation. This is illustrated vividly by the problem of "connecting the dots" in intelligence analysis. It deals specifically with the idea of "a substance-blind approach," which considers the basic inferential characteristics or credentials of evidence (relevance, credibility, and probative force) without regard to the substance or content of the evidence or to the context of the inquiry. This classification of evidence allows us to say general things about evidence regardless of its substance.

Chapter 3, "Principles of proof," develops these ideas in a legal context. It describes the "Rationalist Tradition" that has been the foundation of Anglo-American evidence scholarship and explains why it is relevant to contemporary legal practice. It identifies the forms of logic that must be used in analyzing evidence or in justifying conclusions based upon evidence and demonstrates how they can be applied to legal disputes, using the final exercise in Chapter 1, "An investigation."

Chapter 4, "Methods of analysis," introduces the main methods of analysis used in preparation for trial and their relations to each other: chronologies, the outline method, narrative, and the chart method. It presents a general seven-step protocol that fits all of them, using the material from the *O. J. Simpson* case from Chapter 1 to illustrate its application. We have included this generalized account as a separate chapter for two reasons: first, some teachers may wish to provide an overview of approaches without going into detail about the chart method. Second, in our experience we have found this an effective way of easing students into the rigors of the chart method.

Chapter 5, "The chart method," is the heart of the book for those who wish to master the most rigorous method of analysis. It is a substantially revised version of the method that Wigmore developed for the analysis of mixed masses of evidence early in the last century. It is an intellectual procedure for analyzing and organizing a complex body of evidential data and demonstrating precisely how the inferences from that data can be marshaled in support of and in opposition to the ultimate proposition that must be proved. It also makes it possible to subject selected phases of a complex argument to rigorous microscopic analysis. Such analysis can be used to identify and construct arguments about whether evidence should be admitted or its use restricted, as well as to evaluate the strengths and weaknesses of the particular phase of the argument based upon that data. Each step of the method is illustrated using *United States v. Able* and the *O. J. Simpson* example from Chapter 1.

Chapter 6, "Outline, chronologies, and narratives," considers other methods of analysis in the context of litigation. The outline method is a familiar device. Variations of it are common. It is, on its face, less difficult to grasp and easier to use than the chart method. Chronologies and narratives are other devices commonly used in practice to organize the available evidence and to develop and test arguments based on that evidence. Part C of that chapter, "The litigation context," describes which of the methods is best suited to the various stages of a case.

Chapter 7 uses an edited version of the record of *R. v. Bywaters and Thompson* to illustrate how the chart method can be applied to a complex decided case. The questions at the end have been organized to reflect the seven-step protocol. In our experience, if students immerse themselves in the detail and then are guided through the case using these questions step by step they readily grasp the basics of Wigmorean analysis. However, other cases involving mixed masses of evidence about which there is scope for reasoned disagreement, such as Sacco and Vanzetti, or O. J. Simpson, or the Lindbergh Baby (Bruno Hauptman), or any other complex case, can also be used for this purpose, provided that a detailed record is available and there is a historical doubt about the event.

Wigmore's presentation of the principles of reasoning and methods of analysis falls squarely within the mainstream of Anglo-American scholarship, but he did not satisfactorily address a class of problems that are important for lawyers and that have emerged in recent debates as central issues for scholars. How is the strength of an inference to be determined? How is the net persuasive value of a mass of evidence

to be assessed? How are judgments about the probative force of different items of evidence to be combined? How can the lawyer (or the trier of fact) determine whether a mass of evidence, which logically supports the truth of the proposition ultimately to be proved, satisfies the applicable standard of proof? What do we mean when we say a proposition has been proven to be "more probable than not," proven by "clear and convincing evidence," or proven "beyond a reasonable doubt"? We confront these problems in Chapters 8 and 9.

Chapter 8, "Evaluating evidence," first presents the traditional vocabularies that lawyers and others use in arguing about these issues in court. The next part, "Standards for decision," introduces the distinction between standards intended to guide the decision-makers' exercise of discretion, such as the standards defining the burden of proof, and standards designed to define the limits of discretion, such as the standards that appellate courts apply in deciding whether the decision below exceeded those limits. That part moves beyond the familiar standards of proof to consider standards for other decisions that are involved in the total process of litigation from the first interview of a client to pre-trial decisions, through the trial process and beyond, including standards for lawyers' decisions, decisions to prosecute, and other standards for decision in litigation and adjudication.

Chapter 9, "Probabilities, weight, and probative force," provides a basic introduction to probability theory. It outlines the debates about the application of different theories of probability in legal contexts and elucidates some basic concepts. These debates mainly focus upon whether probability theory should be used in evaluating evidence for cases-as-a-whole – i.e. arguments to a judge or jury. As a practical matter, practitioners, judges, and most legal academics have rejected the use of Bayes's Theorem and other axioms of probability for these purposes, but have recognized that they should play a role in specific contexts – for example, in paternity suits, or disparate impact cases, as the basis for many scientific or expert opinions, or in wrongful death or total disability cases. There are further reasons why lawyers should be familiar with these concepts. Probability assessments have an important role as an aid to making many pre-trial decisions. The decision to prosecute or to contest a case requires analysis of the probability that liability or guilt will be established and, in a civil case, an estimate of the probable quantum of damages. Negotiations to settle a case or to reach a plea agreement are often argued in terms of probability assessments made by each of the parties.[2] Lawyers also need to be equipped to recognize fallacies and misuses of statistics that may be made by their opponents.

Chapter 9 provides the theoretical background to the separate appendix on Probabilities and Proof by Philip Dawid, which is included on the website for this book.[3] The appendix is a basic practical introduction to statistical method applied to

2 A simple formula for negotiating a settlement is discussed in Ch. 8 with an exercise based on *Sargent v. General Accident Co.*, a case presented for other purposes in Ch. 1.

3 Appendix I at www.cambridge.org/9780521673167. There is a second Website for the book at http://analysisofevidence.law.miami.edu/.

legal examples. It explores the theoretical and practical problems posed by the use of mathematical probabilities in evaluating evidence. It introduces some basic axioms of probabilistic analysis and, through a series of problems and exercises, illustrates their application in contexts such as DNA, paternity suits, discrimination cases, and actuarial analysis.

Chapter 10, "Necessary but dangerous," explores at greater length the roles of generalizations and stories in argumentation about questions of fact and the relations between them. This is mainly a theoretical chapter, but it includes two simple protocols that a lawyer might use in testing key generalizations or potential stories in preparing for trial.

Chapter 11, "The principles of proof and the law of evidence," explores the intimate relationship between the principles of proof and the law of evidence, recapping on points where the connections have been touched on previously, especially in relation to basic concepts and exploring these in more detail in relation to hearsay.

Chapter 12, "The trial lawyer's standpoint," integrates the materials and methods introduced in Chapters 2 to 11 into the practical context of preparation for trial. This chapter includes two simple traffic cases that have been adapted from exercises used at the Inns of Court School of Law in London and two more complex problems drawn from the oldest National Trial Competition in the United States. We have found that these cases work well either as a basis for class discussion or as problems for simulated mini-trials on either side of the Atlantic.

## *Changes in this edition*

First, David Schum has joined us as a co-author. Trained in probability and psychology, he has in recent years been concerned with evidence as a multi-disciplinary subject. In *Evidential Foundations of Probabilistic Reasoning* (1994) he argued that other disciplines had a lot to learn about evidence from law, but that lawyers could also benefit by considering those features of evidence that cross all or most disciplines. This "substance-blind" approach to relevance, credibility, and probative force is introduced in Chapter 2, with particular reference to investigation and inquiry in both legal and non-legal contexts.

Second, scientific evidence, such as DNA, and the bearing of probability theory and practical statistics on evidence in legal contexts have increased in importance in recent years. Chapter 9 contains a brief introduction to probability theory; the Appendix provides a practical introduction to the application of statistical methods to legal issues as an optional extra. Placing this on the website has made it possible to shorten the hard copy of the book, while substantially expanding the treatment of statistics.

Third, Wigmorean analysis has become much better known outside legal circles as well as within law. Specialists in decision theory, artificial intelligence, and in other areas have taken great interest in assisting intelligence analysts in "connecting

the dots" or trying to make sense out of masses of evidence. Wigmore's methods are now being routinely applied in such efforts. They have also been applied to investigation of multiple crimes and insurance fraud (Schum (1987), Leary (2003), Twining (2003)). We have expanded the scope of this edition to take account of such developments, especially in relation to intelligence analysis post 9/11.

Fourth, there have been many developments in the law of evidence, civil and criminal procedure, and in scientific evidence.[4] Evidence scholarship has continued to be a lively and pluralistic field. It is now a well-established area in comparative law. Evidence is becoming increasingly recognized as an exciting multidisciplinary subject of great importance in many spheres of practical activity (Schum (1994); Twining and Hampsher-Monk (2003); Twining (2003)). The first edition did not deal in detail with how the principles of proof and the law of evidence interact. We have added Chapter 11 in order to make this relationship clear and to facilitate the integration of the logic of proof and the rules of evidence in teaching.[5]

All of these developments have been taken into account in revising this edition. However, the principles of inferential reasoning, the basic concepts, and the skills involved in analyzing and marshaling mixed masses of evidence are quite stable. We have retained examples that we have found work well in teaching, even though some of them are quite old. We have dropped others and streamlined the presentation. We have tried to make the book more flexible and accessible to a variety of users, by giving clearer signposts.

Throughout this period the authors have continued to think, write, and teach in this area. Our ideas have continued to develop and we have learned from the experience of using the first edition in teaching and from the critical feedback of hundreds of students and some colleagues. Almost all our students have found the process of learning the method challenging and hard work (the motto of our courses has been "tough, but fun"); nevertheless, the vast majority have succeeded in mastering the basic techniques and many have produced work of outstanding quality. Interestingly, the subject has worked best with first year law students in Miami, where it is a popular elective in the second semester. Many of our students have reported that they have found the approach very helpful in practice, some claiming that it was the most useful course that they had in law school. Of course, they

4 For England these developments are surveyed in Zander (2003), Dennis (2004), and Roberts and Zuckerman (2004).

5 Throughout this edition we indicate important points of contact between the principles of proof and the law of evidence. For this purpose, we have used the Federal Rules of Evidence (as amended up to Dec. 1, 2002). This is a coherent, accessible, and important code that falls four-square within the Rationalist Tradition. In respect of English law we make regular reference to Ian Dennis, *The Law of Evidence* (2nd edn, 2002), especially Chs. 1–4, which is generally in tune with our approach. So is Roberts and Zuckerman, *Criminal Evidence* (2004). Michael Zander's *Cases and Materials on the English Legal System* (9th edn, 2003) contains useful discussions of debates and reforms concerning evidence and procedure in recent years. The main points of direct connection between the principles of proof and the law of evidence concern matters such as the basic concepts, relevance, standards of proof, and judicial notice, topics in respect of which there are not great differences between common law jurisdictions.

do not spend time drawing elaborate charts in straightforward cases, but the basic techniques of evidence marshaling and argument construction can become habits of mind that are invaluable and efficient in handling both simple and complex cases. This is hardly surprising because Wigmore's method is essentially a systematization of the "best practice" of good lawyers.

Most of our students and some colleagues are converts. Moreover, the type of analysis involved in the chart method has in recent years attracted interest in a number of fields, including police investigation, intelligence analysis, and various other spheres of practical decision-making (Schum (1987); Leary (2003), Twining (2003)). There are, however, still some skeptics, not least among teachers of the law of evidence (Roberts (2002), Murphy (2001); response by Twining (2005)). We have tried to address their central criticism that the first edition was too substantial and complex to use in an ordinary law of evidence course, and we hope that this edition is more accessible and user friendly.

## *How to use this book*

Our main purpose is to present a vehicle for learning certain usable basic skills of analysis, argument, and practical problem-solving; hence this book can be used as core or supplemental material in a variety of ways and in a variety of courses. Chapter 1 contains a number of concrete examples and exercises that can be used selectively for different purposes.

First, the book can be used as the basis for a self-standing course on analysis of evidence. All three authors have used it in this way for over a decade in a postgraduate course in London, in first degree courses for lawyers and non-lawyers at George Mason University, and, most successfully, as a popular first year elective at the University of Miami Law School.

Second, this edition has been designed so that it can also be used as part of orthodox evidence courses. Anderson has regularly used it during the first three weeks of a standard four-credit course on the Law of Evidence in Miami; Twining teaches it as the first third of the year-long course on Evidence and Proof in the London LLM, the second half of which is devoted to selected topics in the Law of Evidence, the remainder being devoted to a brief introduction to statistical analysis. Other law teachers who have tried to introduce this approach at the start of their courses on evidence have tended to find the first edition too substantial and too dense to use in three to four weeks. With this in mind we have reorganized the book, shortened several chapters, and indicated more clearly how the principles of proof underpin and are integrated into evidence doctrine. We have also provided some guidance to teachers who wish to take some short cuts in order to fit this subject into a few weeks.

We would emphasize, however, that there are no short cuts to learning the basic skills involved. If the learning objectives include mastering the basic techniques of evidence marshaling and the construction and criticism of rigorous

arguments about disputed questions of fact, these can only be acquired by repeated practice involving exercises that are inevitably time consuming for students. However, it is our experience that a student who has acquired these skills can much more rapidly and efficiently understand the law of evidence and its practical applications. In short, studying analysis of evidence takes time, but it also saves time. In our view, the basic approach can be taught in a minimum of eight to ten contact hours together with at least two written exercises.

Third, while the obvious and tested uses are in basic or advanced courses in evidence and trial or pre-trial advocacy, we believe that some chapters can also be usefully employed in any skills course that seeks to develop the intellectual component of practical lawyering skills (and indeed in pre-law and other undergraduate courses concerned with rigorous reasoning about disputed questions of fact). Handling evidence is a basic human skill and a neglected aspect of "thinking like a lawyer." Wigmorean analysis is beginning to feature in the training of intelligence analysts, police investigators, and others. It deserves to be a regular part of the curriculum of first degrees in law.

# Acknowledgments

This book has been in gestation for over thirty years. During this period we have become indebted to so many people that it is impossible to name them all. In addition to those to whom inadequate acknowledgment was made in the first edition, we have since incurred many further debts. In preparing this edition, special thanks are due to colleagues, librarians, and deans in the law schools of George Mason University, the University of Miami and University College London; to Philip Dawid, who has prepared Appendix I on Probabilities and Proof for the website; to our students who have continued to be our most persistent critics and supporters; to Christopher Allen, Kola Abimbola, Ricardo Bacusas, Erica Becher-Monas, Philip Dawid, Ian Dennis, Jason Goldsmith, Michael Graham, Susan Haack, Richard Leary, Donald Nicolson, Mike Redmayne, Paul Roberts, Peter Tillers, and Bill Widen for many useful comments and suggestions; to Deborah Burns, Colette Hanna, Eileen Russell, Erna Stoddart, and, especially, Gloria Lastres, for unstinting assistance with word-processing, scanning, preparation of charts, and much else; to Noah Cox and Sisi Tran for research assistance; and, as ever, to our families, especially Anne, Carolyn, and Penelope for their tolerance, support, help, and love.

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# Table of cases

## Australia



## England



## United States

## *Causes célèbres*[1]



## Hypothetical cases



1 References to these *causes célèbres* are based upon materials in the trial record. Sources where additional information may be found are identified in the References. Additional sources can be found on the internet and at the websites for this book.

# Table of legislation and rules

## England



## United States

# Abbreviations

Some of the points and themes in the text are treated at greater length in other writings by the authors. The following abbreviations for the most commonly cited works are used in the text and notes:[1]

| | |
|---|---|
| *Analysis* | *Analysis of Evidence* (1st edn) by Terence Anderson and William Twining (1991) |
| *Bazaar* | *The Great Juristic Bazaar* by William Twining (2002) |
| *Foundations* | *Evidential Foundations of Probabilistic Reasoning* by David Schum (1994/2001) |
| *Generalizations I* | On Generalizations I: A Preliminary Exploration by Terence Anderson, 40 S. Texas. L. Rev. 455 (1999) |
| *Rethinking* | *Rethinking Evidence* by William Twining (1990/1994) |
| Sacco-Vanzetti | *A Probabilistic Analysis of the Sacco and Vanzetti Evidence* (1996) |
| *Science* | *The Science of Judicial Proof* by J. H. Wigmore (3rd edn, 1937) |
| *Websites* | www.cambridge.org/9780521673167; http://analysisofevidence.law.miami.edu |

1 For full references see References at pages 388–95 below.