§ Law in context

Evidence, Proof and Probability

second edition

Richard Eggleston

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LAW IN CONTEXT

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PREFACE TO THE SECOND EDITION

The first edition, published in 1978, originated from a suggestion of Professor John Cohen, then head of the Department of Psychology at the University of Manchester, who proposed a book 'not too technically legal' on the role of probability in legal proceedings. As work progressed it became apparent that there was a need for such a book for lawyers and law students, as well as for laymen. Because lawyers tend to be repelled by mathematical symbols, I attempted to explain the principles involved in everyday language, without the use of symbols, though some symbols were allowed to creep into the notes at the end of the book. At the same time, technical legal terms, if used at all, were explained in non-legal language. I have found, however, that as lawyers are accustomed to read the notes as they go along, this device proved to be unsuccessful, judging by the complaints I received about the symbols from my friends and colleagues. On the other hand, at least one mathematical critic complained that the text would have been easier to follow if symbols had been used more freely. I have therefore in the present edition inserted symbols and formulae wherever that course seemed appropriate; but the text will make sense even if the symbols are ignored, as verbal explanations accompany the symbols. I hope that one benefit that will result from the change will be that those lawyers who wish to pursue the subject further will become accustomed to the techniques required to understand some of the more esoteric writing on the subject.

While the first edition was in the press, L. Jonathan Cohen published *The Probable and the Provable*, which raised fundamental questions about the application of classical probability theory to legal proceedings, and proposed an alternative kind of probability which he claimed was more appropriate to the practice of lawyers. The

widespread interest which has been aroused by his book has made it desirable that I should go much more deeply into these matters than I had done in the first edition, intended as it was as an elementary exposition of how lawyers regarded probabilities in their relationship to fact-finding. I have accordingly tried to set out the philosophy that I consider should underlie the legal approach to probabilities. I have also found that some of my readers seemed to misapprehend what I meant by 'probability', misled perhaps by the rather mathematical exposition with which I opened Chapter 2. If one's concept of probability is limited to the estimation of chances in games played with cards and dice, and similar situations, the scope for using probability theory in the courts will be considered to be very limited indeed. On the other hand, I do not propose, as some critics seem to have thought, that attempts should be made to apply classical probability theory to every case, by assigning numerical values to the probability of the events deposed to in evidence, where no data exist for estimating those values. The chief advantage to be derived from an understanding of the classical rules will in my view continue to be to expose erroneous reasoning and to concentrate attention on the relevant factors in the search for truth.

During the past five years I have been greatly enlightened by both correspondence and personal discussion with many people who have taken an interest in this subject. This experience has persuaded me that an understanding of Bayes' theorem is essential to the correct analysis of many factual situations. I have accordingly included in an appendix a proof of the theorem couched in language that will be intelligible even to non-numerate lawyers, provided they will take the trouble to master the simple reasoning involved. I have also, in another appendix, discussed the mathematics of the 'island problem', a variation of *People* v. *Collins*, which still seems to be capable of raising fresh difficulties each time it is looked at.

With a view to reducing the number of notes I have changed the method of citation. Books and articles are cited by the name of the author and year of publication, details being given in the bibliography. Cases are cited by the names of the parties, with pages added where required, the full reference being given in the Table of Cases.

There are still some matters that I have judged better dealt with in notes, and these will be found at the end of the book.

These changes have made possible an increase in the size of the text, and the addition of extra pages means that the present edition is

approximately one-third larger than the first. The original text has been revised and where necessary brought up to date, and some chapters have been substantially rewritten, in particular Chapters 3 and 11, in these cases under the stimulus of Jonathan Cohen's ideas, though not necessarily in agreement with them. I have divided the chapter on standards of proof into two, and I have added a chapter in which (among other things) I illustrate how analysis using diagrams can aid correct reasoning about questions of fact.

I renew my thanks to all who were mentioned in the preface to the first edition. To these I must add, in particular, Professor Dennis Lindley, whose interest and enthusiasm for the subject have encouraged me greatly, Professor P. D. Finch, and Dr Natalie Kellett, who has tried hard to save me from mathematical error. Professor Kaye, of Arizona State University, Professor Finney and Geoffrey Cohen, of the Department of Statistics at Edinburgh University, and Richard Havery, of Gray's Inn, have been most helpful in correspondence and personal discussion, and Dr Van Koppen of Groningen, Dr Goldsmith of Lund, and Dr Stein of Basle have kindly sent me material which has added to my understanding. I am also most grateful to Mr Justice Murphy of the High Court of Australia, whose stimulating treatment of factual situations in that jurisdiction gives hope that the ideas I have tried to explain in this book may ultimately receive more general acceptance.

Finally, I renew my thanks to Monash University for affording me the environment which has enabled me to do this work, and express my heartfelt gratitude to Mrs Norma Bolton who, as my secretary, has borne the burden of typing and retyping the manuscript, verifying references and otherwise lightening the burdens of authorship with great efficiency, and with no hint that she found the task otherwise than enjoyable.

CONTENTS

I
Introduction

Ever since the earliest law reports were published, the legal system has been concerned with probabilities, though not all lawyers have recognized the importance of a theoretical study of probabilities in the administration of justice.

According to Rabelais' account of the matter in *Gargantua and Pantagruel*, when Judge Bridlegoose was cited to appear before the High Court of Mirelinguais to state his grounds for a doubtful decision, he explained that his method of deciding cases was by casting dice for the defendant and the plaintiff, and awarding the decision to the party getting the highest score. He said that in the instant case, because of advancing years, he might have misread the dice, especially as they were very small. It was urged on his behalf that in forty years the appellate court had not failed to uphold his judgments when appealed from, a fact that Pantagruel explained by suggesting that Bridlegoose, knowing how obscure the law was, had put himself under divine guidance which revealed itself in the fall of the dice.

Then, as now, resort to games of chance as a method of deciding lawsuits was frowned upon by superior courts. Nevertheless, Rabelais understood four centuries ago that the Bridlegoose system came much closer to the reality than is generally recognized.

The judicial process is commonly thought of as one in which the tribunal first ascertains the truth as to the facts, then decides what the law is, and applies the law so found to the true facts of the case. Where there is a jury, these functions are divided between judge and jury, but because many cases are decided by a judge alone it is convenient, unless the distinction is important, to use the word 'judge' to denote the trier of fact as well as the judge of law. But it is no part of the

judge's task to pursue his own enquiries into the facts. What he does is to give a decision on the evidence presented to him. This evidence is often incomplete, and the judge himself has no part in the collection and presentation of it. Moreover, for a variety of reasons, the material which he is allowed to take into account is circumscribed by rules that prevent all the facts from being put forward, even though one party (and sometimes both) may desire to present evidence which is 'inadmissible'.

Even where no such difficulties exist, the nature of the case may be such that the available material is quite insufficient to enable the facts to be ascertained with any certainty. In *Holloway* v. *McFeeters* the widow of a pedestrian sued the Nominal Defendant (whose task it is to represent the drivers of motor cars, for the purpose of compulsory third-party insurance, where the actual driver cannot be found). All that was known of the accident was that the plaintiff's husband had been found dead in the roadway at night, in a clearly lit street, and that the nature of the injuries and the car tracks and bloodstains at the scene suggested that the deceased had been struck by a motor car. Evidence could of course be given as to the visibility and the general configuration of the roadway, but no person who had witnessed the accident was available. The High Court of Australia, by a majority, held that it was open to the jury to find that the death of the deceased was caused, wholly or in part, by the negligence of the driver of the motor car. The decision was based on the view that all that was necessary was that upon the balance of probabilities such an inference might reasonably be considered to have some greater degree of likelihood than the alternative hypothesis, i.e. that there was no fault on the part of the unidentified driver.

It is plain from this example that probabilities must play a very large part in the decision of cases in the courts. Even in criminal cases, where the judge must be satisfied beyond reasonable doubt, probability theory is often of the highest importance. Yet the legal profession as a whole has been notably suspicious of the learning of mathematicians and actuaries, and ignorant of the work of philosophers in this field. Indeed, recent cases decrying the use of actuarial evidence had become so common that an Australian lawyer who is also an actuary was moved to write a rueful article for the *Australian Law Journal* (Wickens, 1974).

The author quotes three passages to illustrate his point that some of the comments that have been made on actuarial evidence appear to

be due to a complete misunderstanding of what is involved in actuarial computations. Of these the most notable is that of Sir Gordon Willmer in the English Court of Appeal in *Mitchell* v. *Mulholland* (pp. 85–6):

> The average man has an expectation of life of a certain number of years. This is a matter of probability, but for the purposes of actuarial calculation it has to be treated as a certainty. Yet nobody can say whether an individual plaintiff is an average man, or that he will live for the expectation of life of an average man of his age. Any actuarial calculation must, therefore, be discounted to allow for the chance that he may only live for a shorter period. The chances, and not the probabilities, are what the judge has to evaluate in any given case. It is true that there is also a chance that the individual plaintiff may live longer than the average expectation of life. The chances are equal either way, but as a matter of calculation it can be shown that the impact of the chance of shorter life is of greater significance than that of longer life.

As the author of the article points out, there are several misconceptions in this passage, the most remarkable of which for a layman is the proposition that chances are different from probabilities. He concluded his article by making a plea for a reversal of the trend for lawyers to attach less importance to actuarial calculations than they deserved.

Actuarial calculations become significant mainly in cases involving the assessment of damages for future loss, but the impact of probability theory on the law is much more widespread than this. It is the purpose of this book to discuss the part that probabilities play in the law, and the extent to which existing legal doctrine is compatible with the true role of probabilities in the conduct of human affairs.

The legal system is concerned with making decisions, and decisions must often be made in a situation of uncertainty, either as to what has happened in the past or as to what is going to happen in the future. We are not concerned here with uncertainty as to the legal rules, though this is often a matter of anxiety, especially to those who have to decide whether to commence or defend proceedings. Our interest is in uncertainty as to the facts to which the law must be applied.

Although attention will be concentrated in this book on the way in which decisions are made during the trial, it must be remembered that this is only part of litigation. The great majority of civil cases