

# Contents

List of Tables	xiii
List of Figures	xvii
CHAPTER 1	
Statistics—The Word	1
Descriptive Statistics	1
Inferential Statistics	2
References	6
CHAPTER 2	
Distributions	7
The Frequency Distribution	7
Summary Measures	8
Graphs	11
References	14
CHAPTER 3	
Special Averages	15
Index Numbers	16
Some History	19
The Harmonic Mean	22
Averaging Time Rates	23
Simpson's Paradox	24
References	25
CHAPTER 4	
Making Comparisons	26
Comparing Observations	26
Standard Scores	28

Comparing Variables	29
Median and Quartiles	30
Boxplots	32
Ordinal Data	35
The Dollar Scale	37
References	37
<b>CHAPTER 5</b>	
<b>Probability</b>	<b>39</b>
Laplace's Principles of Probability	40
Counting the Ways	45
Poker Hands	46
The Birthday Problem	48
Probability in Court	49
Which Question Was That?	50
References	51
<b>CHAPTER 6</b>	
<b>Craps and Binomial</b>	<b>52</b>
Probabilities for Craps	52
The Binomial Distribution	54
Inference from the Binomial	56
Interval Estimates	59
References	60
<b>CHAPTER 7</b>	
<b>Horsekicks, Deadly Quarrels, and Flying Bombs</b>	<b>61</b>
The Poisson Distribution	61
The Exponential Distribution	64
A Problem of Authorship	66
References	67
<b>CHAPTER 8</b>	
<b>Normal Distribution</b>	<b>68</b>
The Standard Normal Distribution	72
Probability Distribution of the Sample Mean	74
Process Control Chart	76
The Central Limit Theorem	78
References	78
<b>CHAPTER 9</b>	
<b>Political Arithmetic</b>	<b>79</b>
Beginnings in England	79
America to 1790	80
The United States, 1790–1900	81
Statistics and Social Issues	82

1900–1950	85
Since 1950	86
References	87
CHAPTER 10	
Regression and Correlation	89
The Regression Line	92
Variation from Regression	95
Correlation and Galton	97
References	99
CHAPTER 11	
Karl Pearson	100
Karl Pearson—to 1901	100
Chi-Square Goodness-of-Fit Test	102
Karl Pearson—from 1901	105
References	107
CHAPTER 12	
Pearson to Gosset to Fisher	108
William S. Gosset (Student)	108
Ronald A. Fisher	109
Using the <i>t</i> -Distribution	110
References	113
CHAPTER 13	
More Regression	115
Standard Error of the Regression Coefficient	115
Transformations	116
Multiple Regression and Correlation	121
History and Applications	124
References	126
CHAPTER 14	
R. A. Fisher	127
The Analysis of Variance	127
R. A. Fisher—from 1925	130
Experimental Design	131
Postscript	135
References	136
CHAPTER 15	
Sampling: Polls and Surveys	137
Proportions	138
Coefficient of Variation	139

Random Numbers	140
Sampling Methods	142
Election Polls	144
Estimating Sample Size	146
A National Sample	149
References	150
CHAPTER 16	
Quality Control	151
Quality Control to 1930	151
Sampling Inspection	152
The 1930s	154
QC Goes to War	156
Sequential Sampling	160
Post-World War and Today	161
References	162
CHAPTER 17	
Principal Components and Factor Analysis	163
The Principal Component	165
General Intelligence	170
Criticism	174
Ways of Life—An Example	175
Factor Rotation	175
Semantic Analysis of the Ways	176
A Three-Dimensional Map	177
References	180
CHAPTER 18	
Jerzy Neyman	182
E. S. Pearson to Gosset to Neyman	183
Neyman–Pearson Tests	183
The Power of a Test	185
Confidence Intervals	187
Statistical Issues and Personalities of the 1930s	189
Neyman in America	194
References	195
CHAPTER 19	
The Bayesian Bandwagon	197
Utility	197
Utility After Bernoulli	200
Bayes' Theorem	201
The Value of Information	203
Break-Even Problems	204
Bayesian Estimation—The Newsboy Problem	207

Subjective Probability	209
Assessing Subjective Probabilities	210
Bayesian Statistics	214
References	214
CHAPTER 20	
Observational Studies and Program Evaluation	216
The Language of Cause	216
Rival Explanations	218
Analytical Control	220
Auto Death Rates and Safety Inspections	221
Systems of Relationships	224
Discriminant Analysis	228
A Discriminant Analysis of Selection Factors	228
Evaluation and Controlled Experimentation	231
References	234
CHAPTER 21	
Nonparametrics and Robust Methods	236
The Wilcoxon Signed-Rank Test	238
Robustness and Student's $t$	239
Robust Estimation	241
The Jackknife	243
Exploratory Data Analysis	245
References	251
CHAPTER 22	
Statistics—A Summing Up	253
References	260
Bibliography	261
List of Names	269
Subject Index	273