CONTENTS.

	Numbers of formulae		Page
		I. The Law of Causality.	
§ 1.		Belief in Causality	165
§ 2.		The Observations and their Circumstances	166
§ 3.		Errors of Observations	167
§ 4.		Theoretical and Empirical Science	168
		II. Laws of Errors.	
§ 5.		On Repetitions	169
§ 6.		Laws of Actual Errors and Laws of Presumptive Errors	169
§ 7.		The Law of Large Numbers of Repetitions	170
§ 8.		Four Different Forms of Laws of Errors	171
		III. Tabular Arrangements.	
§ 9.		Frequency and Probability	172
§ 10.		Repetitions with Qualitative Differences between the Results	172
§ 11.		Repetitions with Quantitative Differences between the Results	173
		IV. Curves of Errors.	
§ 12.		Curves of Actual Errors of Observations in Discontinued Values	174
§ 13.		Curves of Actual Errors for Rounded Observations	174
§ 14.		Curves of Presumptive Errors	175
§ 15.		Typical Curves of Errors	178
§ 16.		Particular Measures of Curves of Errors	178
		V. Functional Laws of Errors.	
§ 17	1.	Their Determination by Interpolation	179
§ 18.	2—8.	The Typical or Exponential Law of Errors	180
		Problems	183
§ 19.	9—13.	The Binomial Functions	184
§ 20.	14.	Some of the more general Functional Laws of Errors. Series	185

Institute of Mathematical Statistics is collaborating with JSTOR to digitize, preserve, and extend access to *The Annals of Mathematical Statistics.* www.jstor.org

	Numbers of formulae		Page
		VI. Laws of Errors expressed by Symmetrical Functions.	
§ 21.	15—16.	Coefficients of the Equation of Errors. Sums of Powers	186
§ 22.	17—24.	Half-Invariants	188
§ 23.	25—27.	Mean Values, Mean Deviations, Mean Errors	191
		Examples	193
		VII. Relations between Functional Laws of Errors and Half-Invariants.	
§ 24.	28—29.	Their Relations	194
		Examples	195
§ 25.	30—31.	A very general Series by Half-Invariants	197
		VIII. Laws of Errors of Functions of Observations.	
§ 26.		Functions of One Single Observation	199
§ 27.	32—33.	Half-Invariants of Linear Functions	200
§ 28.		Functions of Two or More Observations. Bonds	201
§ 29.	34—35.	Linear Functions of Unbound Observations	202
		Examples	203
§ 30.	36.	Non-Linear Functions	205
		Examples	205
§ 31.	37.	Laws of Errors of the Mean Value. Approximation to the Typical Form	205
§ 32.	38—46.	Laws of Errors of the Mean Deviation and Higher Half-Invariants	208
§ 33.	47.	Transition between Laws of Actual and of Presumptive Errors. Rules of Prediction	211
		Examples	214
§ 34.	48—50.	Determination of the Law of Presumptive Errors when the Presumptive Mean Value is known beforehand	215
§ 35.	51.	Weights of Observations. Probable Errors and other Dangerous Notions	216
		IX. Free Functions.	
§ 36.	52—58.	Conditions of Freedom	217
		Examples	219
§ 37.		Possibility of regarding certain Bound Observations as free	220
§ 38.	59—61.	Every Function of Observations can be divided into a Sum of Two, which belong to Two Mutually Free Systems of Functions	220
		Example	222
§ 39.		Every Single Observation likewise	223
§ 40.		Complete Sets of Free Functions	223
§ 41.	62—66.	Orthogonal Transformation	223
§ 42.	67.	Schedule of Liberation	224
		Example	226
		General Remarks about Computation with Observed or Inexactly Given Values	227
		X. Adjustment.	
§ 43.		Can Laws of Errors be Determined by Means of Observations which are not Repetitions?	228
§ 44.		The Principle of Adjustment	231
§ 45.	68—72.	Criticism; the Method of the Least Squares	232
§ 46.		Adjustment by Correlates and by Elements	234

	Numbers of formulae	XI. Adjustment by Correlates.	Page
§ 47.	73—81.	General Solution of the Problem	235
§ 48.	82—84.	Summary and Special Criticism	236
§ 49.		Schedule for Adjustment by Correlates	237
§ 50.		Modifications of this Method	239
		Examples	239
		XII. Adjustment by Elements.	
§ 51.	85—86.	One Equation for each Observation. Normal Equations	241
§ 52.	87—89.	Special Case of Free Normal Equations	244
§ 53.	90—102.	Transformation of the General Case into the Preceeding Special Case	244
§ 54.	103—108.	The Minimum Sum of Squares	247
§ 55.		Criticism	248
§ 56.		Under-Adjustment and Over-Adjustment	249
		Examples	250
		XIII. Special Auxiliary Methods.	
§ 57.		Lawful and Illegitimate Facilities	258
§ 58.	109—110.	Adjustment upon Differences from Preceeding Computations	258
§ 59.	111—113.	How to obtain Approximate Freedom of the Normal Equations	260
§ 60.		The Method of Fabricated Observations. Example	262
§ 61.		The Method of Partial Eliminations	263
		Example	264
§ 62.	114—116.	Rules for the General Transformation of the System of Elements	267
		Example	269
§ 63.	117—120.	The Method of Normal Places	270
		Example	274
§ 64.		Graphical Adjustment	276
		XIV. The Theory of Probability.	
§ 65.	121—123.	Relation of Probability to the Laws of Errors by Half-Invariants	280
§ 66.	124—125.	Laws of Errors for the Frequency of Repetitions. Obliquity of these Laws of Errors	282
		XV. The Formal Theory of Probability.	
§ 67.		Addition and Multiplication of Probabilities	283
		Examples	285
§ 68.	126.	Use of the Polynomial Formula for Probabilities by Repetitions	287
		Examples	287
§ 69.	127—129.	Linear Equations of Differences. Oppermann's Transformation	288
		Examples	290
		XVI. The Determination of Probabilities a Priori and a Posteriori.	
§ 70.		Theory and Experience	293
§ 71.		Determination a Priori	294
§ 72.	130—133.	Determination a Posteriori and its Mean Error	296
		Example	298
§ 73.	134—137.	The Paradox of Unanimity. Bayes's Rule	298

XVII. Mathematical Expectation and its Mean Error.

	Numbers of formulae		Page
§74.		Mathematical Expectation	301
	138—140.	Examples	302
§75.	141—143.	Mean Errors of Mathematical Expectation of Unbound Events	303
		Examples	304
§76.	144—146.	Mean Error of Total Mathematical Expectation of the Same Trial	305
	147.	Examples	306
§77.		The Complete Expression of the Mean Errors	306