

A TREATISE
ON PROBABILITY

BY

JOHN MAYNARD KEYNES

FELLOW OF KING'S COLLEGE, CAMBRIDGE

MACMILLAN AND CO., LIMITED
ST. MARTIN'S STREET, LONDON

1921

CONTENTS

PART I FUNDAMENTAL IDEAS

CHAPTER I

THE MEANING OF PROBABILITY	PAGE 3
--------------------------------------	-----------

CHAPTER II

PROBABILITY IN RELATION TO THE THEORY OF KNOWLEDGE	10
--	----

CHAPTER III

THE MEASUREMENT OF PROBABILITIES	20
--	----

CHAPTER IV

—THE PRINCIPLE OF INDIFFERENCE	41
--	----

CHAPTER V

OTHER METHODS OF DETERMINING PROBABILITIES	65
--	----

CHAPTER VI

THE WEIGHT OF ARGUMENTS	71 ✓
-----------------------------------	------

CHAPTER VII

	PAGE
HISTORICAL RETROSPECT	79

CHAPTER VIII

THE FREQUENCY THEORY OF PROBABILITY	92
---	----

CHAPTER IX

THE CONSTRUCTIVE THEORY OF PART I SUMMARISED	111
--	-----

PART II

FUNDAMENTAL THEOREMS

CHAPTER X

INTRODUCTORY	115
------------------------	-----

CHAPTER XI

THE THEORY OF GROUPS, WITH SPECIAL REFERENCE TO LOGICAL CONSISTENCE, INFERENCE, AND LOGICAL PRIORITY	123
---	-----

CHAPTER XII

THE DEFINITIONS AND AXIOMS OF INFERENCE AND PROBABILITY	133
---	-----

CHAPTER XIII

THE FUNDAMENTAL THEOREMS OF NECESSARY INFERENCE	139
---	-----

CHAPTER XIV

THE FUNDAMENTAL THEOREMS OF PROBABLE INFERENCE	144
--	-----

CONTENTS ix

CHAPTER XV

	PAGE
NUMERICAL MEASUREMENT AND APPROXIMATION OF PROBABILITIES	158

CHAPTER XVI

OBSERVATIONS ON THE THEOREMS OF CHAPTER XIV, AND THEIR DEVELOPMENTS, INCLUDING TESTIMONY.	164
---	-----

CHAPTER XVII

SOME PROBLEMS IN INVERSE PROBABILITY, INCLUDING AVERAGES	186
--	-----

PART III

INDUCTION AND ANALOGY

CHAPTER XVIII

INTRODUCTION	217
------------------------	-----

CHAPTER XIX

THE NATURE OF ARGUMENT BY ANALOGY	222
---	-----

CHAPTER XX

THE VALUE OF MULTIPLICATION OF INSTANCES, OR PURE INDUCTION	233
---	-----

CHAPTER XXI

THE NATURE OF INDUCTIVE ARGUMENT CONTINUED	242
--	-----

CHAPTER XXII

THE JUSTIFICATION OF THESE METHODS	251
--	-----

CHAPTER XXIII

SOME HISTORICAL NOTES ON INDUCTION	265
--	-----

NOTES ON PART III.	274
----------------------------	-----

PART IV

SOME PHILOSOPHICAL APPLICATIONS OF PROBABILITY

CHAPTER XXIV

	PAGE
THE MEANINGS OF OBJECTIVE CHANCE, AND OF RANDOMNESS	281

CHAPTER XXV

SOME PROBLEMS ARISING OUT OF THE DISCUSSION OF CHANCE	293
---	-----

CHAPTER XXVI

THE APPLICATION OF PROBABILITY TO CONDUCT	307
---	-----

PART V

THE FOUNDATIONS OF STATISTICAL INFERENCE

CHAPTER XXVII

THE NATURE OF STATISTICAL INFERENCE	327
-------------------------------------	-----

CHAPTER XXVIII

THE LAW OF GREAT NUMBERS	332
--------------------------	-----

CHAPTER XXIX

THE USE OF <i>a priori</i> PROBABILITIES FOR THE PREDICTION OF STATISTICAL FREQUENCY—THE THEOREMS OF BERNOULLI, POISSON, AND TCHEBYCHEFF	337
--	-----

CHAPTER XXX

THE MATHEMATICAL USE OF STATISTICAL FREQUENCIES FOR THE DETERMINATION OF PROBABILITY <i>a posteriori</i> —THE METHODS OF LAPLACE	367
--	-----

CONTENTS

xi

CHAPTER XXXI

THE INVERSION OF BERNOULLI'S THEOREM	PAGE 384
--	-------------

CHAPTER XXXII

THE INDUCTIVE USE OF STATISTICAL FREQUENCIES FOR THE DETERMINATION OF PROBABILITY <i>à posteriori</i> —THE METHODS OF LEKIS	391
---	-----

CHAPTER XXXIII

OUTLINE OF A CONSTRUCTIVE THEORY	406
BIBLIOGRAPHY	429
INDEX	459