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Leading Personalities in Statistical Sciences
WILEY SERIES IN PROBABILITY AND STATISTICS

Established by WALTER A. SHEWHART and SAMUEL S. WILKS


A complete list of the titles in this series appears at the end of this volume.
Leading Personalities in Statistical Sciences

FROM THE SEVENTEENTH CENTURY TO THE PRESENT

Edited by

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and

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“If I have seen further, it is by standing on the shoulders of giants.”

Sir Isaac Newton
in a letter written on February 5, 1676
to Robert Hooke
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Preamble

Statistical personalities in this volume have been classified into seven groups called "Sections" according to their status or the field of specialization. The Sections are as follows:

1. Forerunners
2. Statistical Inference
3. Statistical Theory
4. Probability Theory
5. Government and Economic Statistics
6. Applications in Medicine and Agriculture
7. Applications in Science and Engineering

It may happen that a certain person may also be assigned to some other section, in addition to the main section. The numbers of these additional sections are indicated in parenthesis to the right of the name in the Contents listing. The name of the author of an entry is indicated at the end. Unsigned entries have been composed by the editors, either jointly or separately.
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LIST OF SERIES TITLES
This book contains biographical sketches of persons who have contributed to the growth and acceptance of statistical methods since the early Seventeenth Century. It is intended to provide both serious students and interested laypersons with some appreciation of the social and intellectual backgrounds of those to whom statistical science owes much of its current flourishing state. The diversity of these personalities reflects the rich variety of sources and endeavors—seemingly only slightly related—which merged together in the first half of the present century to form the body of ideas and techniques known as "modern statistical methodology." This consolidation was achieved—perhaps fortuitously—just in time to prevent statistical procedures from being absorbed piecemeal into small segments of "computer technology." As it is, we now possess a recognized discipline, providing bases for deciding what to compute, as distinct from directions how to compute.

The main developments leading to the merging of diverse statistical techniques into a bona fide scientific discipline took place in the Nineteenth Century—more particularly in the second half of that century. These developments were, however, based on the pioneering work of many authors during the preceding 200 years. Many aspects of this phenomenon have been described—notably in three remarkable scholarly treatises—by S. M. Stigler (1986), T. M. Porter (1986), and I. Hacking (1992)—together with valuable contributions from several authors in the last 30 years. Much of this work is described in the books of M. G. Kendall, E. S. Pearson and R. L. Plackett (1970, 1977). These works, however, do not cover developments over the last 25 years, or from the earliest periods. The two volumes of Breakthroughs in Statistics (1992, published by Springer-Verlag New York and edited by S. Kotz and N. L. Johnson) and a third volume in preparation at the time when this introduction is being written, may serve as a partial effort at such a study.

However, all of the contributions just described are, perhaps, too formal and "scholarly" for many present-day users of statistical methods. We have, therefore, chosen biographical studies in a way designed to throw light on the interplay of currents of thought in private and public affairs which has led to much of the present-
day outlook in statistical matters. For each personality we have tried to provide, at least, cursory information on the milieu in which his/her activities were conducted, keeping in mind the dictum of Karl Pearson (a major architect in the founding of modern statistics): "It is impossible to understand a man's work unless you understand something of his environment."

Even casual browsing through the pages of this book will demonstrate the wide range of scientific interests among those whose lives and work are described. We note that F. Y. Edgeworth was an economist, J. C. Maxwell was a physicist and P. S. Laplace was a distinguished mathematician and physicist. Even R. A. Fisher—regarded by many as the most influential statistician of all ages—was known in wider scientific circles as a geneticist. T. M. Porter (1986) has presented, in a brilliant and convincing manner, the thesis that all the forerunners of statistics (as we know the subject at present) were primarily mathematicians, physicists, or biologists. We accept this evaluation, adding astronomers to the list. We venture to suggest that the first world-renowned "pure" statistician—with no other label attached—was M. G. Kendall (1907–1983). Only gradually has the profession of "statistician" without qualifying adjective(s) become widely recognized. There is, of course, a considerable range of types of statisticians defined, more or less, by the work in which they are engaged. In particular, biostatisticians, who are concerned with application of statistical methods to problems associated with living organisms, especially with medical matters, have become a well-defined group. Nevertheless, there is an awareness of a basic corpus of concepts and techniques underlying the various specific fields of statistical effort.

Statistics as a science, indeed has deep roots in political economy, astronomy, geodesy, engineering, medicine, and social and biological sciences. It uses probability theory—more specifically, mathematical techniques for analyzing data, derived from probability theory on the basis of various philosophical principles of inductive inference.

Although this volume concentrates on "statistical personalities," we feel it is appropriate to provide a broad picture of milestone events in the history of statistics over the last four centuries. A summary of events up to 1917 is provided in the following table, which is based on a translation, with some corrections and emendations, of a table in Manuale di Statistica by Felice Vinci (pp. 284–286 of Volume 1, 3rd edition, published in 1939 by Nicola Zanichelli, Editore, Bologna, Italy). In the table, the reference Hist. Stat. refers to The History of Statistics, their Development and Progress in Many Countries published in 1918 by Macmillan, New York.
<table>
<thead>
<tr>
<th>No.</th>
<th>Year</th>
<th>Events</th>
<th>Author(s) or Bibliographic Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1532</td>
<td>First weekly data on deaths in London</td>
<td>From C. H. Hill, <em>Econ. Writ.</em> of Sir W. Petty, page LXXI.</td>
</tr>
<tr>
<td>4.</td>
<td>1662</td>
<td>Publication of <em>Natural and political observations mentioned in a following index and made upon the bills of mortality.</em></td>
<td>J. Graunt (1620–1764)</td>
</tr>
<tr>
<td>6.</td>
<td>1693</td>
<td>Publication of <em>Estimate of the degrees of mortality in mankind</em>, in Philosophical Transactions of the Royal Society</td>
<td>E. Halley</td>
</tr>
<tr>
<td>7.</td>
<td>1713</td>
<td>Publication of <em>Ars Conjectandi</em></td>
<td>J. Bernoulli (1654–1705)</td>
</tr>
<tr>
<td>8.</td>
<td>1718</td>
<td>Publication of <em>The Doctrine of Chances</em></td>
<td>A. De Moivre (1667–1754)</td>
</tr>
<tr>
<td>10.</td>
<td>1741</td>
<td>Publication of <em>Die göttliche Ordnung in den Veränderung en des menschlichen Geschlechts aus der Geburt, dem Tode und der Fortpflanzung desselben erwiesen</em></td>
<td>J. P. Süßmilch (1707–1767)</td>
</tr>
<tr>
<td>11.</td>
<td>1746</td>
<td>Publication in France of particular tables on mortality data under the title <em>Essai sur les probabilités de la durée de la vie humaine</em></td>
<td>A. Déparcieux (1703–1768)</td>
</tr>
<tr>
<td>15.</td>
<td>1766</td>
<td>Publication of the first national table on mortality in Sweden: <em>Mortaliteten i Sverige, i andelning of Tabel-Verket</em></td>
<td>W. Wargentin (1717–1783)</td>
</tr>
<tr>
<td>No.</td>
<td>Year</td>
<td>Events</td>
<td>Author(s) or Bibliographic Origin</td>
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<td>----------------------------------</td>
</tr>
<tr>
<td>17.</td>
<td>1790</td>
<td>Publication of the <em>Riflessioni sulla popolazione delle nazioni per rapporto all'economia nazionale</em></td>
<td>G. Ortes (1713–1790)</td>
</tr>
<tr>
<td>18.</td>
<td>1790</td>
<td>First federal demographic census in U.S.A.</td>
<td>T. R. Malthus (1766–1834)</td>
</tr>
<tr>
<td>22.</td>
<td>1812</td>
<td>Publication of <em>Théorie analytique des probabilités</em></td>
<td>P. S. Laplace (1740–1827)</td>
</tr>
<tr>
<td>23.</td>
<td>1825</td>
<td>Publication of <em>Mémoire sur les lois des naissances et de la mortalité a Bruxelles</em></td>
<td>A. Quetelet (1796–1874)</td>
</tr>
<tr>
<td>26.</td>
<td>1832</td>
<td>Publication of <em>Recherches sur la reproduction et sur la mortalité de l'homme au differents ages et sur la population de la Belgique</em></td>
<td>A. Quetelet and E. Smith.</td>
</tr>
<tr>
<td>27.</td>
<td>1834</td>
<td>Establishment of the Statistical Society of London (later, Royal Statistical Society)</td>
<td>A. Quetelet (1796–1874)</td>
</tr>
<tr>
<td>28.</td>
<td>1835</td>
<td>Publication of <em>Sur l'homme et le developpement de ses facultés, ou essai de physique sociale</em></td>
<td>A. Quetelet (1796–1874)</td>
</tr>
<tr>
<td>29.</td>
<td>1837</td>
<td>Publication of <em>Recherches sur la probabilité des jugements en matière criminelle et en matière civile, precedées des regles générales du calcul des probabilités</em></td>
<td>S. D. Poisson (1781–1840)</td>
</tr>
<tr>
<td>No.</td>
<td>Year</td>
<td>Events</td>
<td>Author(s) or Bibliographic Origin</td>
</tr>
<tr>
<td>-----</td>
<td>------</td>
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<td>----------------------------------</td>
</tr>
<tr>
<td>32.</td>
<td>1844</td>
<td>Publication of <em>Recherches mathématiques sur la loi d'accroissement de la population</em> in &quot;Mémoires de l'Académie Royal de Bruxelles&quot;</td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>1861</td>
<td>First complete demographic census in Italy</td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>1869</td>
<td>Publication of <em>Hereditary Genius</em></td>
<td>F. Galton (1822–1907).</td>
</tr>
<tr>
<td>35.</td>
<td>1869</td>
<td>Establishment of the &quot;Société de Statistique de Paris&quot;</td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>1885</td>
<td>Establishment in Den Haag (Netherlands) of the International Statistical Institute</td>
<td></td>
</tr>
<tr>
<td>38.</td>
<td>1889</td>
<td>Publication of <em>Natural Inheritance</em></td>
<td>F. Galton (1822–1907).</td>
</tr>
<tr>
<td>39.</td>
<td>1890</td>
<td>Introduction of the automated screening of census data (John S. Billings and Herman Hollerith) (U.S.A.)</td>
<td></td>
</tr>
</tbody>
</table>
It is a complex task to provide an adequate representative continuation of this table. Here we add a few "points of light" that have illuminated subsequent progress. We note:

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1931</td>
<td>Establishment of the Indian Statistical Institute</td>
</tr>
<tr>
<td>1933</td>
<td>Appearance of <em>Sankhyā</em>.</td>
</tr>
<tr>
<td>1943–1946</td>
<td>M. G. Kendall's <em>The Advanced Theory of Statistics</em>; 2 volumes, published by Charles Griffin, London. Later editions with A. Stuart and then A. Stuart and J. K. Ord have increasing number of volumes.</td>
</tr>
</tbody>
</table>

To assist initial reading of the contents of this book, each personality has been assigned a number reflecting the primary interest of the subject according to the following broad scheme of classification:

1. Forerunners
2. Statistical Inference
3. Statistical Theory
4. Probability Theory
5. Government and Economic Statistics
6. Applications in Medicine and Agriculture
7. Applications in Science and Engineering
For several personalities, their interests could not be limited to a single one of these categories. In the Contents, secondary interests of sufficient importance are indicated by numbers in parentheses. Thus the biography for R. A. Fisher appears with numbers 2 (3,6,7).

We have made substantial efforts to obtain photographs, or other likenesses, of the personalities included in this volume. We thank many statisticians (in many parts of the world) who replied positively to our requests; and also the publishers who graciously granted permission to reproduce. The biographies in this volume are, in the majority of cases, adapted from entries in the *Encyclopedia of Statistical Sciences*, or will appear in the *Updates* to those volumes, expected to be published in 1997–1998. Several entries were written especially for the present publication.

It should be borne in mind that we have tried to present accounts of the "personalities" of the chosen subjects. For this reason, there is generally more discussion of their lives than of technical details of their work. One should not expect, for example, details of the way John Graunt constructed the so-called "first life table," or how to use the sequential probability ratio test of Abraham Wald.

As always, we expect and hope for comments from readers. We welcome criticism on matters of opinion and fact, and correction on matters of record. After a combined total of some 80 years in statistical work, we realize that exchanges of opinions and knowledge are essential to stimulate awareness, among statisticians and others, of the (mostly) glorious past and (hopefully) bright future of this often maligned and misunderstood discipline.

Norman L. Johnson  Samuel Kotz

REFERENCES


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Leading Personalities
in Statistical Sciences
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SECTION 1

Forerunners

ABBE, ERNST
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ACCHENWALL, GOTTFRIED
   O. Sheynin

ARBUTHNOT, JOHN
   E. Shoesmith

BAYES, THOMAS
   R. L. Trader

BERNOULLIS, THE
   G. Schafer

BIENAYMÉ, IRENÉE-JULES
   E. Seneta

BOSCOVICH, RUGGIERO GIUSEPPE
   E. Seneta

DE MOIVRE, ABRAHAM
   E. Seneta

DE MONTMORT, PIERRE REMOND
   E. Seneta

DÉPARCIEUX, ANTOINE

DE WITT, JOHAN
   Hendrik S. Konijn

GRAUNT, JOHN AND
   PETTY, WILLIAM

Helmert, friedrich robert
   Campbell B. Read

HUYGENS, CHRISTIAAN
   Hans Freudenthal

LAMBERT, JOHANN HEINRICH
   Glenn Shafer

LAPLACE, PIERRE SIMON
   I. Grattan-Guinness

NEWTON, ISAAC
   J. Gani

PASCAL, BLAISE
   E. Seneta

QUETELET, LAMBERT ADOLPHE
   JACQUES
   Stephen M. Stigler

'SGRAVESANDE, WILLEM JACOB
   E. Shoesmith

SINCLAIR, JOHN,

SÖSSMILCH, JOHANN PETER
   J. Pfanzagl and O. Sheynin

WARGENTIN, PEHR WILHELM
   Lennart Bondesson and
   Martin G. Ribe
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