

The Life and Labors of Francis Galton: A Review of Four Recent Books About the Father of Behavioral Statistics

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M. Bulmer. *Francis Galton: Pioneer of Heredity and Biometry*. Baltimore: Johns Hopkins University Press, 2003, 376 pp., \$45.00.

M. Brookes. *Extreme Measures: The Dark Visions and Bright Ideas of Francis Galton*. New York: Bloomsbury Publishing, 2004, 288 pp., \$24.95.

A. S. Byatt. *The Biographer's Tale*. London: Vintage, 2000, 320 pp., \$14.00.

N. W. Gillham. *A Life of Sir Francis Galton: From African Exploration to the Birth of Eugenics*. New York: Oxford University Press, 2001, 432 pp., \$45.00.

If one individual can be credited as the founder of the field of behavioral and educational statistics, that individual is Francis Galton. Galton was not a great mathematical statistician; he made no important contributions to that field. In fact, his efforts to earn an honors degree in mathematics at Cambridge resulted in a physical and mental breakdown (Gillham, 2001). The contributions that justify Galton's status as father—or grandfather—of the field are based on his rediscovery of statistical methods and his application of those methods to the measurement of the mental and physical characteristics of humans. Galton deserves credit for our use of such basic analytic frameworks as percentile rank, correlation, and regression. He was not the first to describe the mathematical relationship represented by the correlation coefficient, but he rediscovered this relationship and demonstrated its application in the study of heredity, anthropology, and psychology. He is responsible for the term *correlation* (from *co-relation*), he discovered the phenomenon of regression to the mean, and he is responsible for the choice of r (for *reversion* or *regression*) to represent the correlation coefficient.

Galton developed statistical applications for the behavioral sciences. He demonstrated the importance of the normal distribution and the normal cumulative frequency distribution in understanding human characteristics. Through this research and his influence on Karl Pearson (who provided a mathematically superior alternative to Galton's formulation of the correlation coefficient), Galton influenced "Student" (William Gosset), R. A. Fisher, and the applied statisticians that have followed.

Galton also pioneered the use of surveys in the behavioral sciences. In one study, he asked his fellow members of the Royal Society of London to describe mental images that they experienced. In another, he collected in-depth surveys from eminent scientists for a work examining the effects of nature and nurture on the propensity toward scientific thinking.

Galton's activities did not stop there. Francis Galton was the quintessential Victorian polymath. He was an explorer in Africa years before Stanley uttered the phrase "Dr. Livingstone, I presume." (In fact, later in life he was involved in an unpleasant and very public controversy with Stanley.) When he returned from Africa, he wrote a manual for travelers with advice on topics as diverse as how to cross a river with a horse, protect provisions from foraging animals, and prepare for medical emergencies in the wild. To the explorer in need of medical assistance, he offered the consolation, "Though there is a great difference between a good physician and a bad one, there is very little between a good one and none at all" (Galton, 1883, p. 14).

He collaborated with his cousin, Charles Darwin, providing statistical analysis for results Darwin (1876) presented in his volume on the effects of cross-fertilization. (R. A. Fisher, 1935, later used this as an example of how not to do statistical analysis, but he did so with the advantage of six decades of hindsight.) And he conducted studies that refuted Darwin's hypothesis of pangenesis, a Lamarckian description of how acquired characteristics could be passed on to offspring.

Galton developed weather maps and discovered the existence of the anticyclone. He wrote three monographs on the use of fingerprints and stands as the major influence in the adoption of this technology in criminology. He studied and wrote papers on the visions of sane people, statistical evidence for the efficacy of prayer (the results were not supportive), and the mechanism of heredity (Mendel's work was unknown at the time; Galton conducted his own experiments with peas).

Galton's fascination with and admiration of Darwin's work and his obsession for measurement of human characteristics led to an interest in inheritance in humans. He was the first to make the case that intelligence and other mental characteristics could be inherited, and he published several books of evidence to support his views (e.g., *Hereditary Genius*, 1869; *Natural Inheritance*, 1889). Ultimately, this line of work led to the conclusion that society had control and responsibility for improvement of the human stock. He coined the term *eugenics* (to describe the science that would support such improvement through the control of human mating) and wrote essays and a novel in support of this science.

Among Galton's final works was an autobiography, and shortly after Galton's death in 1911 Karl Pearson (1914, 1924, 1930a, 1930b) wrote a monumental four-volume biography on Galton's life and works. But for the seven decades following the publication of Pearson's opus, Galton received relatively little attention from biographers (Forrest's [1974] volume is a noteworthy exception,

although like Pearson's biography it is now out of print). In recent years, however, there has been a renewed interest in Galton; four volumes have appeared that describe Galton's life. The interested reader can choose from an array of writing styles and perspectives. The most literary of these efforts comes from the pen of A. S. Byatt in the form of a novel. *The Biographer's Tale* tells a story within a story within a story; actually, at the center of the tale are three stories. The narrator/protagonist is attempting to write the biography of a fictional biographer who apparently died while researching three historical figures: Linnaeus, Ibsen, and Galton. The notes for this research are discovered by the protagonist and provide an opportunity to present fascinating (and mostly factual) information about all three of these individuals. Readers who are already convinced that they wish to know more about Galton will likely not be satisfied by the intriguing but all too brief presentation provided by Byatt. The reader who starts with Byatt's novel likely will decide that he or she wishes to know more, but time spent reading the novel will not have been wasted.

Of the three recent volumes taking a more traditional biographical approach, Brookes's *Extreme Measures: The Dark Visions and Bright Ideas of Francis Galton* is the most accessible. It has been written with a broad audience in mind and is the least scholarly of the three. Brookes inserts descriptions of his personal experiences at locations visited in the process of researching the book and so establishes a relaxed, narrative style that is pleasantly readable. Brookes's biography is also the briefest of the three; as such, it lacks detail about some aspects of Galton's life. Although there is discussion of Galton's obsession for measurement, there is little attention given to his statistical innovation.

The volume is also limited by Brookes's tendency to see every aspect of Galton's life in relation to his views on eugenics. Brookes fails to place Galton's views in the context of the times in which he lived. In the process, he makes too little of a distinction between Galton's views and the final solution practiced by the Nazis decades after Galton's death. Although Galton's views of the indigenous populations that he encountered in Africa might well be seen as enlightened by Victorian standards, Brookes views them with a 21st-century perspective and finds evidence of Galton's intolerance. This intolerance is then used as a basis for interpreting Galton's eugenic interests. Little attention is given to Galton's sensitivity about the importance of developing a plan within the constraints of social acceptability. Similarly, Brookes makes no effort to place Galton's views within the social and historical context of the times; for example, it should be remembered that both Karl Pearson and R. A. Fisher actively participated in the eugenics movement.

Gillham's *A Life of Sir Francis Galton: From African Exploration to the Birth of Eugenics* differs from Brookes's effort in several important respects. The Gillham book is less a narrative and although not exhaustive, provides a more detailed academic account of Galton's work. It is also much more substantial (at more than 400 pages) and concludes with nearly 40 pages of notes and

references. Gillham's effort differs from that of Brookes's in that although nearly half of his volume falls in the section titled *The Triumph of Pedigree*, particular emphasis is not placed on eugenics. Eugenics is considered in the context of his life and work rather than the other way around.

Although not written in the conversational tone of Brookes's biography, Gillham's style is pleasant and readable. The notes and references will be valuable to the serious reader, and the book also has numerous illustrations. One expects a biography to contain at least a few photographs, and Gillham obliges; more interesting are the many tables and figures from Galton's own papers and monographs.

Finally, Michael Bulmer's *Francis Galton: Pioneer of Heredity and Biometry* provides a highly focused review of Galton's contributions to genetics and applied statistics. Bulmer begins with an introductory chapter that gives an overview of Galton's life; the reader progresses from Galton's birth to old age in 41 pages. Following this overview are eight chapters that focus on Galton's ideas about statistics, hereditary ability, the laws and mechanisms of heredity, eugenics, evolution, and biometry. Bulmer offers a well-balanced description of these areas. He describes Galton's innovations and contributions, but he is also willing to point out where and when Galton got it wrong. Galton discovered regression to the mean, but his mathematical understanding of regression was limited; Galton carefully collected and studied data to understand the mechanisms and laws of heredity, but he never produced an accurate model to explain those data.

Although Bulmer provides a reasonably extensive reference list, he does not include footnotes and does not follow the academic writing practice of providing references in support of his assertions. This is somewhat surprising considering that this is far and away the most detailed of the discussions of Galton's intellectual efforts. Although this lack of referencing will be a disappointment for some readers, Bulmer does provide considerable background and framework for interpreting Galton's work within the context of the times. For example, in discussing Galton's statistical theory of heredity he shows how Galton's views changed over time and contrasts those views with Mendel's and Pearson's, among others.

Bulmer's work provides the most detail on Galton's use of statistics. Although the statistical presentations (occasionally including matrix formulation) will not present a challenge to readers of this journal, much of the discussion is in the context of genetic theories; the relatively naive reader can make his or her way through the text, but Bulmer clearly expects his reader to have some background in this area.

Together, these four books provide a range of options for becoming familiar with the contributions that Francis Galton made to statistical and biological science. In addition, any readers who are left wanting more can seek out Galton's original works or Pearson's encyclopedic biography. This said, the best introduction to Galton's life and work may well be his autobiographical writing on the subject, *Memories of My Life* (1908). Whatever choices one makes, it is

clear that with the range of current works on Galton there is no excuse for ignorance about this foundational figure in the field of applied statistics.

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