to distribute the additional votes. It is quite possible that this arguing with other reformers damaged the prospects for appealing to a wider audience.

As with his earlier work on choice theory, the project fell upon deaf ears. The leaders of the political parties (including Salisbury) were more concerned with balancing the interests of their members than with any abstract principle of fairness. The picture that most worried Dodgson was that of a large number of constituencies, each with one representative, and each with a small majority of voters of the same party. The result would be a landslide, with the minority party not represented anywhere close to its strength in the nation as a whole. While Salisbury was also eager to avoid that result, he did not look at the country in quite the same uniform way that Dodgson imagined. Subsequent students of the history of political theory paid tribute to Dodgson’s work, which was related to that of Huntington on the same issue in the United States, but the parliamentary history of the United Kingdom was not altered by Dodgson’s proposals.

In addition to the more serious and substantial pieces in this collection, Abeles has also included some of the lighter contributions by Dodgson to the debates and a couple of items of political satire. One of these is signed “A Liberal of the Liberals”, something of a parody in its own right in view of Dodgson’s predilection for the Conservative Party. It is a reminder that “Lewis Carroll” was not the only pseudonym under which Dodgson wrote. Those interested in assessing Dodgson’s attitude toward various articles and pamphlets will find it helpful to look at the choice of pseudonym as well as the tone of the piece.

The texts of the pamphlets and letters have been reproduced in this edition with great care. Mistakes have not been altered but they have been pointed out in the introductions. Abeles offers not just the standard scholarship on Dodgson’s work in these areas, but her own account when that differs from those of her predecessors. There are occasional slips, but they never interfere with the sense of the text. At one point Abeles wonders why a contributor (G.A. Simcox) to the discussion of redistribution would have referred to the “Rule of Three” in the title of his objection to an aspect of Dodgson’s proposal, since it does not have to do with the rule of three as mathematically understood. It is tempting to think that Simcox (or the editor who supplied the title) would have been familiar with the discussion of the Rule of Three in “Fit the Fifth” of The Hunting of the Snark, which had appeared in 1876 and where the original Rule of Three also disappears from consideration. Also, if Abeles had included translations of the Latin and French tags in the texts, the modern reader would have benefited, although it may be that she was restricted by the limitations of the series in which the volume appeared.

If there is one aspect of Charles Dodgson’s personality that emerges from this collection, it is the commitment to fairness and preservation of the rights of the minority. In situation after situation, he tries to devise a method of making sure that preferences will be respected. His inability to affect the issues of his day, whether on the collegiate or the national level, on the basis of his contributions to the debate may have been an expression of his personality as well as his determination not to be associated with a particular party. Nevertheless, the view of Charles Dodgson as a private citizen putting his mathematical talents to work for the public good emerges in a memorable way from this collection.

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Karl Pearson: The Scientific Life in a Statistical Age

Karl Pearson (1857–1936) appears in standard references as an applied mathematician, the founder of biometrics, and the originator of much of modern statistics (see, for example, Eisenhart, 1974). Indeed, after graduating as third
wrangler in the Cambridge Mathematical Tripos of 1879 and holding a fellowship at King’s College from 1880 to 1886, Pearson became professor of applied mathematics and mechanics at University College London in 1884. In the 1890s, he began fruitful collaborations with zoologist Walter Frank Raphael Weldon and proto-geneticist and eugenicist Francis Galton. During this period, he elaborated on Galton’s idea of correlation, developed his method of moments, his system of fitting curves to data, and the chi-squared test for determining the “goodness of fit” of those curves. With Weldon in 1901, he founded *Biometrika*, a research journal devoted to the application of statistical methods to biology. In 1911, Pearson was installed as the holder of the very first chair in eugenics, endowed by Galton’s estate, in which capacity he created University College’s Department of Applied Statistics, directing its operations until his retirement in 1933.

Some of these biographical details can be gleaned from *Karl Pearson: The Scientific Life in a Statistical Age* by Theodore M. Porter, but they do not compose the heart of the author’s work. Rather, Porter focuses on Pearson’s intellectual activities, particularly his writing and lecturing from the time he finished at Cambridge until the early years of his statistical research, through the end of the century. During these decades, Pearson studied and wrote about a wide range of philosophical and literary figures, including Spinoza, Rousseau, Ibsen, Goethe, and Hegel. He read extensively in medieval German religious literature and developed his political philosophy in light of his analysis of Martin Luther and the history of the Reformation. He gave lectures on these topics as well as on philosophy of science, statistics, and “the woman question” to popular audiences in London, becoming one of England’s leading authorities on the issue of women’s rights.

While biographers focusing on Pearson’s statistical research have tended to treat these interests as diversions from his scientific pursuits that he ultimately abandoned, Porter sees them as tightly woven into the fabric of Pearson’s entire intellectual life. Researchers who use statistical methods remember Pearson for the tools that bear his name and look upon statistics as a model of objectivity. Porter argues that Pearson believed fervently in the coherence of all his interests, loathed the idea of being remembered for a single, isolated discovery, and saw his contribution to statistical science not as the creation of a “routine, mechanical, and bureaucratic vision of science” (p. 314), but as a “cognitive and moral framework for the formation of citizens and elites” (p. 9) and a means of reshaping “public discourse, overthrowing the egoistical appeal to private interest and prejudice by institutionalizing the socialist idiom of impersonal science and consensus” (p. 352). As Porter portrays him, Pearson lived his life and developed his scientific ideas “in perpetual engagement with his world” (p. 11).

Porter divides the book into 10 chapters. In the first and last, he lays out the elements of his thesis, describing in broad terms the aspects of Pearson’s life that he intends to explore and providing his rationale for focusing closely on careful readings of Pearson’s nonstatistical writings. From these writings, Porter sets out to construct the interior, mental life of Karl Pearson. While he provides some of the standard elements of a biography throughout the book—important names and dates, details about places and events, and Pearson’s contributions to his fields of interest—Porter’s central concern is the full range of Pearson’s thoughts, what influenced them, how they evolved, and how his seemingly disparate interests held together.

Brief background information about Pearson’s parents, his matriculation at Cambridge, and his progress toward taking the third wranglership form the framework of chapter two. In addition to highlighting the interests and questions that dominated Pearson’s intellectual development in the late 1870s, Porter provides some information about King’s College, Cambridge and about the mathematical Tripos of the late 19th century. Chapters three through five explore Pearson’s literary, historical, and religious writings, mostly from the years 1879 through 1884. Analyzing some of Pearson’s works of fiction, a passion play, letters, and unpublished notes, Porter describes Pearson’s evolving views about the inaccessibility of nature, his emerging socialism, and his forays into medieval German history.

In chapter six, he covers in detail Pearson’s writings and activities associated with the Men’s and Women’s Club that he organized from 1885 through 1890. Here, along with tracing Pearson’s ideas about the role of women in late Victorian England and describing his relationships with several women in the club, including Maria Sharpe, whom he married in 1890, Porter provides an interesting glimpse into the questions shaping the women’s movement of the time.

Chapter seven is, to some extent, a bridge to the statistical interests of the second half of Pearson’s career. It focuses on Pearson’s writings in mathematical physics in the 1880s as well as on his beliefs about the role of science in society, particularly as outlined in the early editions of his *Grammar of Science*. Porter sees a thread of continuity running from Pearson’s *Grammar* to the statistical research he would begin in the 1890s. For Pearson, statistics would become
a “model of impersonal and rigorous reasoning” (p. 213), exactly what was needed, as the Grammar argued, by a society trying to “unite individuals into a coherent social whole” (p. 213).

Pearson’s hope that science, properly taught, was the key to educating an effective citizenry manifested itself in his participation in efforts to reform London’s university system in the early 1890s. Porter briefly describes these efforts in chapter eight. In this chapter, the book finally comes to Pearson’s statistical research. Most accounts of Pearson’s work point to the genetic investigations of Galton and Weldon as the source of his statistical interests, but Porter makes a convincing case that while Weldon’s and Galton’s questions would motivate most of Pearson’s research, it had its origins in his introduction of graphical methods into the engineering curriculum of University College.

The penultimate chapter finds Pearson immersed in the statistical investigations for which he is best known today: those of correlation, curve fitting, and the chi-squared test. Here, Porter examines how Pearson’s conception of science as description and his interest in evolution influenced his technical ideas. Pearson’s approach to his subject put him in personal and professional conflicts with many of his contemporaries—the statistician R.A. Fisher and William Bateson, champion of Mendelism, among them. These conflicts owed as much to Pearson’s dominating personality as to real differences in scientific thinking, and Porter also provides a look at the impact of that personality on Pearson’s relationships with the staff in his laboratories.

The chapter concludes with a discussion of Pearson’s writings about the place of science in the education of effective citizens. According to Porter, Pearson regarded science, exemplified by statistics, as the basis of wisdom, and “a proper scientific education [as] indispensable for every person in a position of authority” (p. 292). Proper scientific education was not the narrow training of a specialist, although some needed such training. Rather, the best education for leadership fostered a thirst for both broad and deep knowledge, supplied by science, but informed as well by history and literature.

For Porter, much irony resides in Pearson’s hopes for an educated elite citizenry shaped by science and statistics. Pearson conceived of these pursuits in broad terms and “bemoaned the poverty of science walled off into narrow specialties” (p. 300). He advocated “enthusiasm and creativity,” not the “standardized form of scientific practice” to which his statistical language and methods eventually contributed (p. 309). He saw science as “the basis of shared values and a unified culture” (p. 6), yet his own work in the development of statistical methods contributed in large measure to an increasingly narrow public role for science.

Porter’s title for his book captures this irony. The book creates a picture of a scientist in a statistical age of his own making that differs markedly from today’s image of both that role and its place in the current age. Porter’s picture, constructed from an impressive mastery of Pearson’s immense collection of writings—published and unpublished—as well as extensive reading in the 18th- and 19th-century literature in which Pearson immersed himself, provides a fascinating and somewhat unconventional view of Pearson’s intellectual inner life.

Somewhat unconventional, too, is Porter’s method of constructing this view. It relies not only on Pearson’s own descriptions of his beliefs and philosophical perspectives in publications, lectures, and letters, but also on an analysis of Pearson’s fiction. Porter maintains that just as Pearson “looked to literature for deep truth” (p. 45), he revealed himself in his own fictional writings. The writings of others, fictional and not, also play a large role in Porter’s explication of Pearson’s ideas, sometimes as direct influences on those ideas, sometimes as part of the broader intellectual context in which Pearson worked. At times, the discussion of these other writings is so tightly interwoven with Pearson’s own words, that the line between context and influence becomes blurred. For example, the ideas of H.G. Wells, Thomas Huxley, and Winston Churchill figure in Porter’s analysis of Pearson’s views on the place of science in education, almost as part of a conversation (pp. 293–295). No evidence is offered, however, that Pearson was responding to their ideas. Neither does Porter assert any direct influence in either direction, but the structure of the passage might mislead an inattentive reader.

Of course, authors have a right to expect their readers to be alert. Porter also expects them to be conversant in fairly disparate subjects. Readers trained in statistics will feel at home in the brief technical discussions of curve fitting and degrees of freedom. They may find the longer analyses of German philosophy and literature less hospitable, though more central to the book. Any reader, however, with an interest in the full range of intellectual forces that shaped Karl Pearson and the science he helped create at the turn of the 20th century will find the book thought-provoking and engaging.
Numerous books and articles have appeared in the past decade dealing with the use of the history of mathematics in the teaching of mathematics. In fact, in 1997 the International Commission on Mathematical Instruction commissioned a study in its ICMI Studies series to consider this issue. As is standard with ICMI studies, an international conference took place (in 1998), and in 2000 the 10th ICMI Study appeared, *History in Mathematics Education*, edited by John Fauvel and Jan van Maanen. Since the appearance of this book, work in this area has increased, leading to numerous journal articles and presentations at national and international conferences.

The book under review originated in two contributed paper sessions at summer meetings of the Mathematical Association of America, which were in turn stimulated by the editors’ realization that there was a dearth of material on using recent history of mathematics in the mathematics classroom. Indeed, the majority of the mathematical ideas referred to in the ICMI Study come from an earlier time period. Thus the current book is a welcome supplement to that volume. Of course, as in nearly any collection of articles, there is a great variation in quality and significance. Nevertheless, this compilation contains many articles which will be of great use to college teachers who want to use the history of recent mathematics in their teaching.

The first three sections of this collection contain 15 articles demonstrating how to use particular ideas from the history of recent mathematics in teaching various undergraduate courses, while the final section, with 7 articles, deals with more general ideas on the history of mathematics and its teaching. I will only briefly consider 13 of the articles.

David Pengelley begins the work by giving us some brief selections from Arthur Cayley’s first paper on group theory [Cayley, 1854] and then showing how to make use of these excerpts in an introductory abstract algebra course. Most importantly, he emphasizes the pedagogical importance of asking the students questions about Cayley’s article, forcing them to consider how Cayley’s definitions and results compare with the material they find in their textbooks. (An instructor using this material might also wish to consult the recent article by Chakraborty and Chowdhury [2005].)

Lawrence D’Antonio, in a more extensive article, discusses the use of six original sources in dealing with the notion of elliptic curves. However, he does not give us the sources themselves but only outlines them, noting that in the senior-level course he has taught, excerpts from the original sources are read by the students. Nevertheless, a teacher who follows even parts of D’Antonio’s program will lead his students quickly into some very deep aspects of number theory and introductory algebraic geometry. For example, D’Antonio writes about the algebra text of the Islamic mathematician Baha’ al-Din Muhammad ibn Husain ’Amili (1547–1621) on finding all rational solutions of a particular set of two equations in three unknowns. D’Antonio then shows how this problem was transformed by Édouard Lucas in the 1870s into a problem involving rational points on an elliptic curve, which then provides a good example to illustrate various definitions.