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BOOK REVIEWS AND NOTICES

Robert L. Brown, *Introduction to the Mathematics of Demography*, pp. 230, published by ACTEX Publications, Winsted, Conn. 06098, 1991.

People are important, and statistics is the branch of science dealing with the collection, analysis, interpretation, and presentation of numerical data. It follows from these two disparate premises that demography, the statistical and mathematical study of human populations, is important. The Society of Actuaries and its predecessor organizations have accepted this chain of reasoning, and as a result, demography has been part of the education program for actuaries for many years.

One generation of actuaries studied demography from *Population Statistics and Their Compilation* by Hugh H. Wolfenden [6], published by the Actuarial Society of America in 1925 as "Actuarial Study No. 3." The revised edition was published in 1954 by the Society of Actuaries. Succeeding generations of actuaries studied the subject by reading *Introduction to Demography* by Mortimer Spiegelman; the first edition was published in 1955, and the revised edition in 1968. The next generation of students will probably learn demography from *Introduction to the Mathematics of Demography*, because it is now the principal reference for Course 161, Mathematics of Demography.

The author, Robert L. Brown, is Associate Professor, Department of Statistics and Actuarial Science, University of Waterloo, Waterloo, Ontario. He has served as President of the Canadian Institute of Actuaries and has been a frequent contributor to the literature of demography.

The word "mathematics" in the title should be taken seriously. Much of Chapter 6 and all of Appendix C are devoted to the mathematics of the continuous version of stable population theory. Some of the fascinating interconnections between this theory and ruin probability results from risk theory are indicated.

Chapter 7 on population projections introduces projection matrices. These projection matrices, with survival and birth rates as elements, are called Leslie matrices for the biostatistician and demographer who investigated their properties in the late 1940s. If the Leslie matrix remains constant over time, the population will approach a stable age distribution. This is illustrated in Chapter 6, but the development is somewhat sketchy. The rich theory that can be revealed by a spectral decomposition of the Leslie matrix is not developed.

Because of the emphasis on the *mathematics* of demography, some of the traditional topics of demography are absent. For example, Spiegelman's revised edition included chapters on the geographic distribution, education and income of the population and the work force. These ideas are not represented in Brown's book.

The construction of life tables from census data is, however, covered in Chapter 4. The construction of the 1985–87 Canadian Life Tables and the 1979–81 U.S. Life Tables is described.

The *Mathematics of Demography* has topics that also belong to other areas of actuarial mathematics. For example, Chapter 3 is devoted to the life table, which is also covered by Jordan [2, Chap. 1], Bowers et al. [1, Chap. 3], and London [3, Chap. 3]. Consequently, Chapter 3 is not on the reading list for Course 161.

Chapter 5 is entitled Stationary Population Theory and has much in common with Jordan [2, Chap. 8] and with Bowers et al. [1, Chap. 18]. Stationary populations are unrealistic models that serve primarily as stepping stones to more useful models. Yet they persist in actuarial literature. I conjecture this is because of the elementary but challenging puzzles that can be derived from these models.

Unlike its predecessor books by Spiegelman and Wolfenden, the book by Brown is a textbook. Each chapter concludes with a set of exercises. Some of the exercises are based on questions that have appeared on Course 161 examinations.

Chapter 8, the final chapter, is modestly entitled "Use of Census Data." In fact, most of the chapter is devoted to the gargantuan issues involved with population projections and Social Security funding. Marketing and work force planning uses of census data are not covered.

When one finishes this book, the first reaction is gratitude. At last, students have in one volume some of the main ideas in the mathematics of demography and a set of exercises for sharpening their skills. The second reaction is to review the basic actuarial education materials in the closely related fields of mortality estimation and projection, life table construction, and the mathematics of demography. With the compartmentalization of these topics, as a consequence of the effort to organize basic education into discrete courses, an important topic could be overlooked.

Has this happened? I believe that the answer is yes. Standard mathematical methods for projecting total populations are covered in Chapter 7 of Brown's book. Mortality projection, which is a critical component of population projection, does not receive much attention in this book or in the other references used in the associateship courses. Spiegelman and Wolfenden both reviewed time trend and generational approaches to mortality projection. These ideas pop up in actuarial practice in the construction and use of annuity mortality tables.

Projecting the size of the population over age 85 is primarily a problem of mortality projection. At least in the U.S., there is a good reason for not being satisfied with the success of existing projection methods at these high ages. These problems are important in Social Security and pensions and, to a lesser extent, in life insurance. It seems that the book by Brown, and the other references for the associateship courses, are somewhat deficient in this field.

There is no comprehensive mortality projection method that carries with it a guarantee of forecast accuracy. In fact, most of the developments of recent years have tended to reinforce and sharpen concerns about traditional mortality projection methods. For example, cause-of-death analysis is an important tool in mortality projections. In Chapter 4 Brown reviews the methods developed by Greville. Everyone who has done cause-of-death analysis has worried about the assumption of independence between causes or the restrictions imposed by particular parametric models to avoid the independence assumption. In recent years these worries have been made more explicit by several papers. The question is, Does the nonidentifiability theorem in competing risks (see Tsiatis [5]) limit our ability to project mortality in other than a naive fashion?

I hope that in later editions of Brown's interesting book, or in other basic education materials, the methods and problems of projecting mortality will receive the attention they deserve.

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John Baynes and Hugh Maclean, *A Tale of Two Captains*, pp. 178, published by The Pentland Press, Ltd., Kippielaw, Haddington, East Lothian, Scotland, 1990.

The title of this book suggests a single story woven around the primary characters. In fact, it contains two very different accounts about two very different individuals likely unknown to one another. Rory Malcolm Stuart Baynes and Joseph Brotherton Maclean are, however, forever connected in English literature through two common ties. They both served in the Cameronians (Scottish Rifles) during World War I. Also, they were each blessed with a son who wanted to honor the memory of his father. The author-sons have edited the accounts of their fathers' lives into a very readable two-part book.

The two accounts are quite different. Mr. Baynes has given us an interesting account of his life from childhood during the last years of the reign of Queen Victoria until 1917. The detail and clarity of his early life in the service of the Cameronians are all the more remarkable considering that the material was dictated when he was in his eighties and nearly blind. Death cut short the final chapters of his account of the war years. Mr. Baynes remained in the Cameronians until his retirement from service in 1937.

In contrast, Mr. Maclean's story is preserved in the form of letters to his brother in New York, which cover the period 1914 to 1919. What this format lacks in continuity is easily made up for with the candid account of life in the trenches during that very difficult time. It is quite remarkable to note Mr. Maclean's strong interest in actuarial matters and insurance throughout his participation in the war. Actuaries will read with particular interest the war history of one who left a job with the Mutual Life Insurance Company in New York for the field of battle with the Cameronians.

The actuarial profession is a benefactor of Mr. Maclean's "close calls" in the trenches. Mr. Maclean would continue his actuarial career after the war, becoming President of the Actuarial Society of America in 1942. He was well-known for his book *Life Insurance* and was the author of many papers and discussions in the *Record of the American Institute of Actuaries* and the *Transactions of the Actuarial Society of America.*

It is not often that actuaries are given such a personal insight into the life of one of their own. For that reason, Mr. Maclean's account will be of interest to many in the actuarial profession. The entire book will be interesting to many others who, 75 years later, are freshly interested for themselves or for loved ones in life on the battlefront this time in the Persian Gulf.

EDWARD F. COWMAN

Lawrence B. Goodheart, *Abolitionist, Actuary, Atheist: Elizur Wright and the Reform Impulse*, xiii + 282pp., published by The Kent State University Press, Kent, Ohio, and London, England, $29.95.

Since the centenary of his death in 1985, the actuarial profession has paid several tributes to pioneer North American actuary Elizur Wright. Ernest J. Moorhead, Charles G. Groeschell, and Walter L. Rugland presented a commemorative panel discussion of Wright's role as an actuarial practitioner at the New Orleans Annual Meeting in 1985 [3]. Mr. Moorhead's *Our Yesterdays* [2], released for the Centennial Celebration, discussed Wright's pivotal role in placing the business of insurance on a financially sound and equitable basis in North America, first in his role as Massachusetts Insurance Commissioner (1858–1867) and later as an independent consulting actuary. A rare example of the mechanical calculating machine, or arithmeter, which Mr. Wright developed and patented to assist actuaries in their computations, was exhibited by John Fibiger at the Centennial Celebration.

Drawing on the Wright papers at the Harvard Business School Library and the Library of Congress, historian Lawrence Goodheart has now presented us with a full biography of Elizur Wright, which places his long and fruitful life in the context of nineteenth century reform. An 1826 graduate of Yale University, Wright began his adult life with the intention of pursuing a career in the ministry. Near the end of his life, he was, with Colonel Robert Ingersoll, one of the most notable atheists among American intellectuals. In the intervening decades, he was college professor, antislavery editor and organizer, translator of *La Fontaine*, newspaper proprietor and editor, consulting actuary, insurance reformer, civil libertarian, and conservationist. Many actuaries will undoubtedly be surprised to learn that insurance reform was only a part of the "sisterhood of reforms" for which Elizur Wright labored.

Among the most poignant impressions left by the perusal of Mr. Goodheart's book will surely be the glimpses that it affords of Wright's full but difficult personal life. His long marriage to Susan Clark Wright produced 18 children, of whom 13 predeceased their father. (Two of the children, Lucy Jane Wright and Walter Channing Wright, practiced as actuaries in their own right.) The financial and personal distress of the Wright family following Elizur's departure from the organized abolition movement will pull at the hearts of many readers. While Wright was in England in 1844 to promote his translation of *La Fontaine* and to study the operations of English insurance companies, the family home in suburban Boston burned; Wright and his wife persevered only with the help of their own strength and financial help from their antislavery friends.

The outspoken Wright made powerful enemies throughout his long and varied career. He was accused of impropriety during his term as Massachusetts Insurance Commissioner (he had paid his children $1,000 for clerical assistance with his laborious computations) and was criticized late in life for accepting a retainer from the Equitable Assurance Society, one of the foremost writers of the tontine dividend plans that he had criticized so strongly earlier in his career. As President of the National Liberal League, he was painted as an advocate of smut and blasphemy. He spent his final years largely occupied with the conservation of what is today the Middlesex Fells Preserve near his home in suburban Boston.

Wright has been called "The Father of Life Insurance" (the title of a 1937 biography published by the University of Chicago Press [4]), and his reports as Massachusetts Commissioner have been reprinted as *The Bible of Life Insurance* [1]. His advocacy of net premium reserves, nonforfeiture values, and annual dividend distribution was a salutory influence in the overheated insurance business of the second half of the nineteenth century. Wright himself would have undoubtedly questioned whether they would continue to represent solutions for the problems of the more mature business of a century later. However, his insistence upon the responsibility of insurance organizations to conduct their business in a responsible and equitable manner is as relevant today as it was a century ago.

Elizur Wright should be an inspiration for regulators seeking a modern solution to the problem of life insurance company insolvency. His principles, if not all his tools, remain perfectly valid. Mr. Goodheart's book rightfully assesses Wright in the context of the "sisterhood of reforms" to which he devoted his life, among which insurance reform forms only a part. As such, the book forms a perfect complement to the discussion of Wright's actuarial career in the 1985 commemorative panel [3] and in Moorhead's *Our Yesterdays* [2].

I believe many actuaries will find this biography fascinating reading for its revelation of the full range of Wright's personal and public life. I could not think of a better reading for the Fellowship Admissions Course than this fine biography of America's greatest pioneer actuary. Wright's entire public career forms a case study in conscientious devotion to the public interest as he saw it. I think Wright would support today's calls for increased regulation of the actuary as a professional accountable to the public. If our profession can preserve the intellectual and entrepreneurial freedom of its members while assuring public accountability, it will continue to fulfill the role that its North American pioneer foresaw for it.

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Matthew Lesko, *The Federal Data Base Finder*, A Directory of Free & Fee-Based Data Bases & Files Available from the Federal Government, Third Edition, pp. lv, 571, published by Information USA, P.O. Box E, Kensington, MD 20895, 1990.

The Introduction states that the directory "will assist you in identifying the data bases and data files [of U.S. federal departments and agencies] by providing a description, stock number (if necessary) and address and telephone number of a person or office to contact for more information." With 571 pages and a 55-page table of contents as well as a 49-page index, this 8.5×11-inch book certainly tries hard to be informative; a telephone number (toll) is provided for help and updates. The book is also available on diskette.

Each item reported on is identified by its official title and a reference number followed by a short but adequate descriptive paragraph. The book is arranged alphabetically by source, listing first the federal departments such as Agriculture, then the independent agencies, for example, the Federal Trade Commission, followed by the Judicial Branch agencies, one Executive Branch agency (Office of Management and Budget), and then the Legislative Branch agencies such as the General Accounting Office. Items are listed by title alphabetically within each department or agency. An example of a listing under the Department of Commerce follows:

***Households by Income and Age of Householder, and Owner-Occupied Units by Value and Age of Householder**

Customer Services
Bureau of the Census
Washington, DC 20233 (301) 763–4100

In this special tabulation, a small set of tabulations (age of persons, age of householder by value, age of householder by household income, aggregate value by age of householder, aggregate household income by age of householder, and aggregate income by age of persons) is presented for the following areas: States, counties and county equivalents, incorporated places and census designated places of 2,500 or more persons, minor civil divisions, census county divisions, block numbering areas, and census tracts. The file is available on 9 reels of computer tape (1 reel per region) at 6250 bpi.

Because the listings under each department are not further broken down by major entity such as the Bureau of the Census in the Department of Commerce or Social Security in the Department of Health and Human Services, a researcher looking for Census data is faced with a hodgepodge of material from the many agencies in the Department of Commerce. Oddly, the book does not list the entities housed in each department—a researcher must know in what department a particular agency is located. Agencies like the Bureau of the Census are listed in the Index together with a listing of page numbers, but the page numbers include pages in parts of the book under other departments or agencies. Further, many listings do not identify the source agency. It is strange that a book of this size that is intended to help in locating sources of data does not take what seem like obvious steps to help those not familiar with the structure of the U.S. Government.

Despite its shortcomings, *The Federal Data Base Finder* will be useful to any organization that finds itself in occasional need of specific government data or reports and does not have resident experts who know exactly where to go. Further, the book does provide a good overview of the wide variety of data available from the federal government—data you never knew you needed until you read *The Federal Data Base Finder.* Even a casual review of the Index is enlightening.

There are other sources of information about government data bases and reports—periodic listings and catalogues provided by the agencies themselves. Some reports are free, and others are available at nominal cost. A list of statistical agencies by department appears in *Statistical Programs of the United States Government, Fiscal Year 1990*, published by the Office of Management and Budget. The Bureau of the Census publishes a Monthly Product Announcement (call Customer Services at 301/763-4100). Their annual Census Catalog and Guide listing publications in print is available from the Government Printing Office (call 202/783-3238). The National Center for Health Statistics (NCHS) periodically publishes a catalog of recent reports and a monthly update is available (call 301/436-8500).

Research activities in the field of health care are reported on by the Agency for Health Care Policy and Research (AHCPR), Public Health Service, Department of Health and

Human Services (call 301/443-4100). The Statistics of Income Division, Internal Revenue Service, Department of the Treasury publishes quarterly the Statistics of Income Bulletin containing financial statistics and analyses of data from tax returns. For information or to receive their periodic notice, *Data Release*, write to Director, Statistics of Income Division, R:S:P, Internal Revenue Service, P.O. Box 2608, Washington, D.C. 20013-2608. Economic data are available from the Bureau of the Census, the Bureau of Labor Statistics (call 202/523-7827) and the Bureau of Economic Analysis (call 202/523-0777).

Despite budgetary limitations on the statistical agencies and the effects of the Paperwork Reduction Act, government data cover a wide range of subjects, are timely and controlled for accuracy and are available free or at reasonable cost. *The Federal Data Base Finder* can be a Baedeker to government data.

ROBERT J. JOHANSEN

Anita Rapone, *The Guardian Life Insurance Company, 1860–1920. A History of a German-American Enterprise*, pp. 209, published by New York University Press, 1987.

Quick! In 1860, what city had the largest German population in the world, after Berlin and Vienna? Why, New York City, of course. (Bet you knew it all the time.) Not only was New York's German population large, it was also stable, with almost no tendency to assimilate through intermarriage. The German community had a very strong support structure, with its own banks, legal aid society, hospitals, and agencies with German-speaking professionals to assist new immigrants in finding housing and jobs.

It seemed a natural development for such a tightly knit community to have its own life insurance company. To fill this need, the Germania was founded in 1860 by Hugo Wesendonck and other prominent German-American businessmen. It was originally founded as a "mixed" company, paying dividends to both policyholders and stockholders. The initial capitalization was $200,000, twice the minimum then stipulated by New York State law. Wesendonck's salary as president was set at the princely sum of $3,750 per year. The first policy was sold on July 17, 1860. By the end of the year, 170 policies had been sold; 150 whole life, ten short-term life, five endowments, and three "children's endowments"—all in all, a promising start. In most cases, commissions were 20 percent in the first year, and 5 percent in renewal years.

Caution was the byword in risk selection. The company's medical examiners were instructed to be particularly wary of insuring "persons under 30 years of age, or even somewhat older, all those who are either very tall or very fat or otherwise in any respect differing from a normal condition, and women generally."

As the friendly New York City market began to become saturated, Germania began to reach out to German-American communities across the nation. Wesendonck took control of marketing and traveled to address groups in various cities. His technique was effective: he would give a rousing speech on the German Revolution of 1848, from which he was a refugee, and then earnestly discuss the virtues of life insurance. Members of the audience, who probably didn't understand too much about life insurance, but who thought it sounded like a good idea, signed up in large numbers. This worked for a while, but by the 1870s the Germania had decided that a more permanent marketing presence was required. Local agencies were established in many areas of the country, ending Wesendonck's career as a traveling promoter.

The leaders of Germania retained strong ties to the mother country, often sending their children there for education. Germany, with its emerging middle class, was the logical next step for expansion, and Wesendonck considered German risks superior to those of the U.S. In 1868, a branch was opened in Berlin, and efforts were begun to establish agencies in other mainland European countries. The German branch thrived, although the Franco-Prussian War of 1870 interrupted business for several months. However, business was generally less successful in other countries, largely due to high costs and in some cases high taxes (not to mention the company's strong German identity).

Back in the U.S., the Depression of the 1870s put the insurance industry through its severest crisis. The number of life insurance companies doing business decreased from 71 in 1870 to 29 in 1881. The author notes that insurance company failures "had a strong, negative impact on public confidence in the insurance industry" (sound familiar?). To get the company through the Depression, Wesendonck cut expenses by consolidating agencies and by instituting various cost control measures, tightened up on the underwriting of new business, and increased dividends to improve policy persistency. This was enough to keep the company afloat until the economy entered an upward cycle in the early 1880s.

The following decades saw several problems that were faced by Germania and the rest of the industry:

- First-year lapse rates of 50 percent or more, followed by second-year lapse rates not much better.
- Widespread rebating of part of the commission in a supercompetitive sales environment.
- Forays into industrial insurance and tontines (both largely unsuccessful for the Germania).
- Another severe depression, beginning in 1893, in which the unemployment rate topped 20 percent at times.
- An unsuccessful hostile takeover bid in the early 1900s.

Hugo Wesendonck retired in 1897, but his place was taken by Cornelius Doremus, who had also been with Germania since its founding in 1860. Even with this continuity of leadership, Doremus had plenty of problems to contend with: friction among home office departments, demands from the Berlin branch for more autonomy, and accusations that Doremus himself was using his office for personal gain. (Despite these accusations, Doremus survived in office until 1915, giving him a grand total of 55 years of service with the company.)

Germania was included in the Armstrong Investigation of 1905, but emerged without any specific criticism. The author notes the interrogations were conducted mostly by Charles Evans Hughes, a "brilliant young lawyer who would later become governor of

New York" (a curious reference, given that Hughes would also become his party's candidate for President in 1916 and go on to become Chief Justice of the U.S. Supreme Court). Some of the exchanges between Hughes and Doremus are worthy of note. When Hughes asked whether Germania's business in Germany was more profitable than that in the U.S., Doremus answered "It has been better in every respect. . . costs less and stays better." (The first-year commission on German business was 35 percent, compared to 65 percent in the U.S.) Also, Germans tended not to drop their policies, which Doremus attributed to "a matter of national temperment." Asked about salaries, Doremus said his own salary was $18,000 per year, the vice president $12,500, the second vice president $10,000, the actuary $6,000, and the secretary $5,000. (By contrast, the president of Mutual of New York received $150,000 per year.) When asked if it were possible to get Germania's expenses down to the point where there was no loss from premium loadings, Doremus said he didn't think so, but that this loss was more than offset by gains from interest, mortality and lapse. Even with stiff competition and high expenses, a relatively small company like Germania could make significant additions to surplus each year at the turn of the century.

World War I was the event that was to change the destiny of the Germania forever. The following quotes tell much about the place of German-Americans, and the Germania itself, in the public consciousness at that time.

> "The German-American community was vulnerable to charges of un-Americanism because it retained a strong self-identity and vigorous ethnic-community institutions that kept it somewhat separate from the general populace. America was dotted with German lodges, alliances, clubs, and publications; parks contained statues of famous Germans, such as Goethe and Schiller. In 1917 there were still 522 German-language newspapers and journals publishing in the United States. The unification of Germany in 1871 and the glorification of the restored empire by Germans and German-Americans alike fortified the sense of ethnicity and created a feeling of special relationship between the immigrants and the home country. The four decades after unification saw pan-Germanism flourish as never before, and with it ideas about Germanic superiority that offended or unnerved many onlookers."

> "From the beginning of the war in 1914, many German-Americans had been rather active in support of Germany and therefore constituted a political pressure group for an American policy of neutrality. With the American declaration of war, these segments of the German community did an about-face and began to engage in public ceremonies such as flag presentations to demonstrate their loyalty to the American government. At the same time, shortly after declaring war, the federal government created the Committee on Public Information to mobilize support for the war. Headed by George Creel, a progressive journalist, the committee published massive amounts of propaganda, much of which contributed to a national wave of hysteria against German-Americans. A campaign to eradicate all presence of German culture swept the country, resulting in acts such as state prohibition of the teaching of German in

public and private schools, the removal of books in libraries, bans on the use of German language in public, and even the denial of concert halls to German artists. The names of towns, streets, schools, and businesses were changed as a demonstration of patriotism."

Despite the Germania's efforts to demonstrate patriotism and support of the war effort, there were accusations and insinuations of un-Americanism. By 1917, it was clear that the company's name had to be changed. On March 1, 1918, the company formally adopted its new name: the Guardian Life Insurance Company. The next logical step was to divest itself of its European business. In 1919, the company stopped issuing new business in Europe. Throughout the early 1920s, the existing European business was sold off to various European companies. In 1925, the Guardian mutualized, to defend against charges of foreign influence or ownership. The transformation of the company to its present form was complete.

What kept the Guardian from growing into an industry giant? The author provides an interesting analysis in the Epilogue. Essentially, the company's conservative stance and narrow ethnic focus caused it to miss out on the explosive growth of the life insurance industry in the 1880s and 1890s. Even though the Germania grew substantially during this period, its growth was dwarfed by that of companies like Metropolitan, Prudential, and New York Life. (Between 1875 and 1905 the Metropolitan was growing *sixty-three-fold*.) Also, German immigration to the U.S. slowed during this period, both in absolute and relative terms, which shrunk the company's potential market.

The author has produced an interesting and valuable addition to the growing library of histories of the life insurance industry.

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