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BOOK REVIEWS AND NOTICES*

Robert J. Myers, *Medicare*, pp. xvi, 352, Richard D. Irwin, Inc., Homewood, Ill., 1970. $9.50.

Are abortions covered by Medicare? While Bob Myers does not tell us, he does answer more questions than you are likely to ask about Medicare and Medicaid.

This is a textbook on three aspects of Medicare and Medicaid: (1) historical and legislative development, (2) cost estimates, and (3) benefits and administration.

Most likely, it will initially be read for its detailed description of current Medicare and Medicaid benefits and the reimbursement procedures therefor. I believe, however, that its important long-range contribution to the actuarial profession will be, first, as a history of medical care legislation in the United States and, second, as a textbook on the cost-estimating processes of governmental medical programs.

Since today's college graduate was still in high school when Medicare began, we must realize that, within a few years, our students and younger actuaries will probably take Medicare for granted much as the generation that matured in the 1940's and the 1950's accepted the existence of the universal income tax or old-age and survivors benefits. Knowledge of the road that medical care legislation traveled from the first proposals in this century's initial decade to the passage of the Medicare law fifty-nine years later will be necessary both to understand the present structure of these governmental programs and to anticipate future changes and how they are likely to be enacted.

Starting with the formation of the American Association for Labor Legislation (AALL) in 1906, Mr. Myers[1] (who resigned from the Social Security Administration in 1970 after thirty-six years of service, having been chief actuary since 1947) leads us through the model bills, private movements, presidential commissions, and congressional proposals that reached a climax with the 1965 social security amendments that established Medicare and Medicaid. From out of the past comes the roll call of congressional authors: Wagner-Murray-Dingell, Flanders-Ives, King-Anderson, Forand, and Kerr-Mills.

The lobbying, hearings, and political stances on the many legislative proposals, their rejections, and their revisions which finally led to the 1965 Act are

* Books and other publications noted with an asterisk(*) may be borrowed from the library of the Society of Actuaries under the rules stated in the *Year Book*.

[1] Mr. Myers' unique qualifications were described by Mr. G. W. K. Grange in his review of *Social Insurance and Allied Programs* in *TSA*, XVII, 95 (1965). To his description, I feel that I need only mention that *Medicare* has the benefit of an additional five years of experience by Mr. Myers.

described. Federal, and especially congressional, interest in various aspects of the insurance industry (e.g., the protection of privacy, front-end loading, and "consumerism") has never been greater. In particular, the most significant changes in the nature of health insurance will almost certainly come from or be influenced by federal legislation. Mr. Myers has produced a valuable text for the actuaries who will have to understand, cope with, and live with these legislative processes.

In only a few instances has the author not given the general reader sufficient background to understand fully the political and philosophical forces that were operating during Medicare's development. I believe that a more complete description of the State 65 plans would have been most useful to future students of this subject. Also, the varied (and sometimes bewildering) stances on medical assistance for the aged (Kerr-Mills law) by both the proponents and opponents of Medicare would have been enlightening. Some state legislators supported Kerr-Mills plans in order to encourage further federal action, while others were pro-MAA in the hope that it would forestall greater federal involvement in medical care legislation. Similar tortured logic was found among those who opposed state implementation of Kerr-Mills plans.

Mr. Myers' description of the Medicare costing procedures is a worthy supplement to and updating of his excellent treatment of the "Methodology for Actuarial Cost Estimates for Social Security Programs" and "Actuarial Cost Estimates and Statistical Information for OASDI" in his *Social Insurance and Allied Government Programs*.[2] This earlier book (and its September, 1965, supplement on the 1965 social security amendments) has served the actuarial profession (and, particularly, Part 8 students) well. Consideration should be given for including chapters 4, 10, and 11 of *Medicare* on the syllabus of future Part 8 examinations. His valuable chapter 11, "Medicare Experience," should make us grateful that he did not write this book sooner. By comparing experience with estimates, we are better able both to appreciate estimating techniques and to be aware of the pitfalls and inevitable yet unpredictable conditions that will cause the actual costs to vary from the expected. It should be mentioned here that this area of the book has been updated for the 1969 hospital insurance cost estimates by "Actuarial Study No. 71."[3]

The author describes in detail the eligibility and benefit provisions and the reimbursement and financing principles of the original Medicare and Medicaid legislation and the changes therein during its first half-decade. Since they affect what people will receive or what they will pay, eligibility, benefits, and financing are, in varying degrees, familiar not only to actuaries but also to the general public. Since reimbursement has received little public attention, however, we should appreciate the attention given herein to the methods that have been

[2] Richard D. Irwin, Inc., Homewood, Illinois, 1965, pp. viii, 258.

[3] R. J. Myers and W. C. Hsiao, *Actuarial Cost Estimates for Hospital Insurance Program*, "Actuarial Study No. 71" (Washington: Social Security Administration), 38 pp.

devised for paying beneficiaries, physicians, hospitals, group practice plans, and other health care institutions.

Medicare is divided into four parts (containing fifteen chapters) plus two appendixes and a selected bibliography.

PART I: THE DEVELOPMENT OF MEDICARE

The first three of the four chapters of this part tell the story of Medicare's development and enactment. They include the 1967 changes and conclude with President Nixon's 1969 Medicare legislative proposals.

This story contains some irony as well as history. For example, there is this 1917 statement from the *Journal of the American Medical Association:*

> To work out these problems is a most difficult task. The time to work them out, however, is when the laws are molding, as now, and the time is present when the profession should study earnestly to solve the questions of medical care that will arise under various forms of social insurance. Blind opposition, indignant repudiation, bitter denunciation of these laws is worse than useless; it leads nowhere and it leaves the profession in a position of helplessness as the rising tide of social development sweeps over it.

By 1920 the AMA had completely changed its position and was vigorously fighting health insurance proposals in state legislatures. In this opposition they were joined not only by several life and casualty insurance companies but also by Samuel Gompers of the AFL!

In the twenty-five years following the 1935 passage of the Social Security Act, the most significant governmental health insurance developments were the inclusion of disability insurance under social security in 1956 and the formation of the state cash sickness programs in California, New Jersey, New York, and Rhode Island. Most important was the 1949 plan in California, which included provision for medical payments of $8 a day for up to twelve days of hospitalization.[4] In 1960, the Kerr-Mills Act added medical assistance for the aged to the public assistance programs under social security.

The King-Anderson bill in 1961 was the first legislative proposal restricted solely to all OASDI eligibles aged 65 and over, the basis on which Medicare was finally enacted. The next four years saw many proposals for varying degrees of federal participation in medical care for the aged. Medicare was an issue in the 1964 elections, and Mr. Myers notes that a result thereof was the seating in 1965 of a House of Representatives that was sympathetic to such legislation. He then describes the actions in each house and in the conference committee that led to final passage in the summer of 1965.

Chapter 4 discusses the problems involved in actuarial cost estimates for health benefits. Service benefit costs are not as readily determinable as are cash benefits (e.g., OASDI) related to covered earnings. Mr. Myers' office found few useful data to help them. Blue Cross had not maintained accurate exposure and claims data on an accrual basis by age. Insurance company group data were

[4] This benefit is now $12 a day for up to twenty days.

mostly on ages under 65. Individual health insurance benefits (and statistics) were related to charges rather than costs, as were whatever data were available on State 65 plans.

Assumptions had to be made with respect to future trends in cost levels for hospitals and the auxiliary benefits of the hospital insurance portion of Medicare. The supplementary medical insurance cost estimates made some use of data from the Connecticut 65 plan.

PART II: THE MEDICARE PROGRAM

Chapters 5 and 6 deal in depth with eligibility and benefit provisions. Mr. Myers observes that Medicare has led the way in the United States in providing benefits for out-of-hospital substitutes for inpatient-care benefits.

Chapter 7 covers reimbursement principles. Hospital insurance (HI) reimburses on a reasonable cost (nonprofit) basis (somewhat like Blue Cross). The differing reimbursement provisions for nonprofit and proprietary hospitals and for inpatient and auxiliary benefit care are explained. Most supplementary medical insurance (SMI) payments go to physicians who are paid on a reasonable charge basis. The mysteries of the physicians' profiles and the method of determining "prevailing charges" are herein revealed. SMI reimbursement procedures for group practice plans and for miscellaneous supplies are also described.

Chapters 8 and 9 cover financing and administration, respectively. HI is supported by payroll taxes on employers and employees, while SMI is financed by premium payments and matching federal contributions. HI is expected to be self-supporting with respect to its benefits and administrative expenses. Unlike OASDI, HI financing will be hurt by rising wages, since the "maximum wages" will limit taxes but not benefit costs. Premium rates for SMI, which started at $3.00 a month in 1966, had to be increased to $4.00 in 1968 and to $5.30 in 1969.

Wherever possible, nongovernmental intermediaries have been sought to act between the Social Security Administration and the various providers of service. SMI requires a third party between the physician and the government to allay doctors' fears of federal control.

Among the Social Security Administration's Medicare responsibilities for HI are the following: approving the use of intermediaries, having underlying responsibility for general administration of the program, collecting and analyzing statistics, and preparing actuarial cost estimates. In addition, for SMI, the Social Security Administration has primary responsibility in enrollment and in the collection of SMI premiums. It maintains a central file of records on each individual's SMI expenses to determine the $50 deductibles.

Chapter 10 discusses actuarial cost estimates for Medicare. Insurance industry cost estimates have been higher than those by the Social Security Administration, principally because the industry assumed more utilization and higher unit costs. Mr. Myers reports that the insurance industry had recommended cost-sharing provisions in Medicare to prevent overutilization; yet, he comments, "When the law was finally enacted, many insurance companies developed

supplementary policies to fill in the deductible and coinsurance provisions! In fact, some companies offered policies that pay a flat amount per day hospitalized, a payment several times the cost-sharing on the average, thus providing a direct financial incentive to stay in the hospital." He does add that some companies were just trying to salvage what they could from their largely destroyed health insurance business. Also, he notes, Blue Cross was already selling such supplementary plans. This chapter also touches on some of the political problems associated with changing SMI premium levels.

Chapter 11 discusses Medicare experience. Based on an HI actuarial sample for 1966 and 1967, admission and utilization rates, average duration and daily charges, and average unit costs for various types of HI benefits are presented. Benefit experience is sparser for SMI than it is for HI, because there is more lag between time of service for SMI benefits and the time of statistical tabulation. The best SMI data sources are a 0.1 per cent actuarial sample of payment records and the Current Medicare Survey.

Chapter 11 also discusses the HI and SMI trust funds. In the comparison of actual expense experience with the estimates, cash basis versus accrual basis problems emerged; thus 1966 HI benefits payments were 87 per cent of expected while 1967 payments were 135 per cent of expected. The most likely reasons, however, for 1966 administrative expenses being 198 per cent of expected are relatively high start-up expenses, particularly in connection with enrollment of the noninsured eligibles. The actual 1967 administrative expenses were 100 per cent of expected.

Mr. Myers admits that insurance industry and Blue Cross Association estimates were closer to actual experience than were some Social Security Administration estimates; he points out that none of the three (industry, BCA, SSA) anticipated the sharp rise in hospital costs following the middle of 1965. Studies made for the 1969 HI cost estimates ("Actuarial Study No. 71")[5] indicate that hospital costs, extended care facility costs, and utilization rates of home health benefits are all higher than the 1968 HI cost estimates had assumed. The extended care facilities utilization rate has been lower than was previously assumed; this most likely resulted from administrative controls by the Social Security Administration.

PART III: THE MEDICAID PROGRAM

Chapter 12 deals with Medicaid legislative provisions and chapter 13 with the operation of the Medicaid program. The relative importance of Medicaid was not realized at first. Under the original legislation, broad state plans might have covered 35 million people. The 1967 amendments were more restrictive for eligibility, setting the upper net income limit at 133⅓ per cent of the standard for aid to families with dependent children. Determining an applicant's income and assets has been a big problem. Some states use written statements plus a sample verification check.

[5] Myers and Hsiao, *op. cit.*, pp. 20–22.

The first New York plan would have made 40–45 per cent of the population eligible for Medicaid. Not only was it quickly amended, but it led to the restrictive federal 1967 amendments. California's "Medi-Cal," though extensive, is not as complete as is New York's current plan. By January, 1969, forty-three of the fifty-four jurisdictions had Medicaid programs; each had to adopt Medicaid by 1970 or lose federal participation in public assistance for medical services.

The federal matching formulas for financing Medicaid vary between 50 and 83 per cent, depending on average per capita incomes of the jurisdictions.[6] No long-range future cost estimates have been made for Medicaid, but it now appears that even short-range costs will be substantially higher than those estimated in 1967.

PART IV: RELATED CURRENT DEVELOPMENTS AND POSSIBLE TRENDS

Chapter 14 describes private insurance relationships to Medicare. Blue Cross and Blue Shield supplementary plans generally require that both HI and SMI be elected. By covering Medicare gaps, they subvert cost-sharing. They usually provide for liberal benefit coverage outside the United States. (Medicare provides no foreign coverage except in Canada or Mexico for certain emergencies.) Many insurance company plans are not supplementary to but independent of Medicare. There is some excess benefit coverage in force due to individual policies that were guaranteed renewable beyond age 65. Group insurance plans were modified with the coming of Medicare.

Chapter 15 discusses possible future trends. Among possible changes in Medicare eligibility requirements, the author discusses coverage of DI beneficiaries, all OASDI beneficiaries (regardless of age), and the total population (universal federal medical coverage). Benefit provision changes could include extension of the period of protection, revision of the cost-sharing provisions, and coverage of out-of-hospital drugs, private-duty nursing, or other medical services. With respect to the basis of reimbursement, Mr. Myers observes that, if Medicare covered everyone, the current "reasonable charges" criterion would not work because there would be no large base of non-Medicare patients to provide a "yardstick."

Liberalization of Medicaid will depend largely on the desire and ability of the states to fund the benefits.

Appendix I presents the definition of "Social Insurance" that was developed by the American Risk and Insurance Association in 1965.

Appendix II gives the steps for computing the standard deviation for an illustrative case of a distribution of physician fees.

I have put less value on the major portion of this book, which deals with the current features of Medicare and Medicaid, because this is its most perishable material. For most people (including actuaries), other books, pamphlets, charts, and guides, published both privately and by the Social Security Administration, will provide faster and more convenient answers to questions about benefits or

[6] P = federal matching ratio; N = national average per capita income in base period; S = state average per capita income in base period; $P = 100 - 45(S^2/N^2)$, and $50 \leq P \leq 83$.

funding. I do believe that the coverage of reimbursement procedures will be most useful to serious students of Medicare and Medicaid.

The chapters on cost estimates are currently ideal text material. The nature of this subject being very perishable, however, periodic updating will be necessary. "Actuarial Study No. 71" has done this through 1969.

It is for its historical content that *Medicare* should earn a permanent place on the actuarial bookshelf. Perhaps this tale will turn out to be but a part of the development of much more comprehensive government medical programs in the future. For the next few years, it is likely to remain substantially the whole story. Regardless of future developments, with this book the student of Medicare will know how and why we got where we are.

JEROME M. STEIN

Francis Scheid, *Theory and Problems of Numerical Analysis*, "Schaum's Outline Series," pp. 422, McGraw-Hill, 1968. $4.95.

M. V. Wilkes, *A Short Introduction to Numerical Analysis*, pp. 76, Cambridge University Press, 1966.

These two textbooks are of particular interest because they have been chosen for use in the Society's Part 3 syllabus on numerical analysis that will go into effect in 1971. Even with the limited number of chapters assigned for the examination (only about half the material in the two books), the subject is stretched far beyond the confines of the present Part 3 finite differences course. Nevertheless, most of the present subject matter, such as interpolation, numerical integration and differentiation, and calculus of operators, is set forth in as much detail in the new texts as it was in the familiar Freeman text; only in the case of summation is the treatment less thorough. In addition, the new syllabus assigns chapters on estimation of calculation errors, Gaussian integration, elimination of singularities in numerical integration, and iterative methods of solving equations.

There is a wide difference in style and method between the two books. The Scheid book uses an unusual format, in which each chapter consists of a summary (often quite abbreviated) of the subject matter, a section entitled "Solved Problems," and finally the traditional end-of-chapter problems for the students. On the cover of the book the claim is made, in apparent reference to the central section of each chapter, that 775 problems are "completely solved in detail"; but the designation "Solved Problems" does not mean quite what it seems to, for these central sections are given over more to the necessary development of the subject matter, such as derivations and proofs (and each is counted as a "problem"), than to actual problems involving applications of the subject matter. Nonetheless, this approach is, with few exceptions, quite effective, and the student is helped, rather than hindered, by knowing where he is headed before he gets mired in detail.

On the other hand, the Wilkes book is much briefer, covers much less ground, and there is nothing in it that is not in Scheid. Its value lies in the author's ability to communicate an appreciation and understanding of the spirit of the

subject. In a well-worded chapter on "the role of numerical analysis," Wilkes does, as a matter of fact, give an excellent rationale for the expansion of the actuarial syllabus in this new direction.

After all, numerical analysis, although unfamiliar to some actuaries under that title, is necessarily the basic approach in a science which starts with a survival function for which there is no general expression. Numerical answers to numerical questions is a way of life for our profession, and, as Wilkes points out in a more general context, this attitude is one that often permits complete treatment of problems that are impervious to pure mathematical analysis. As he also points out, the main drawback of numerical analysis is its computational complexity. Today, however, the computer fills this gap and indeed supplies what is, for numerical work, the analogue of the general solution in pure mathematics.

But the computer does, in a sense, rob us of much of our ability to apply directly numerical intuition and judgment in the process of doing calculations. With the computer, the pitfalls and the nature of the approximations must be foreseen.

And thus it is most useful to have the emphasis, particularly evident in Scheid, on analysis of errors (rounding errors, truncation errors, and so on), although it is surprising that the statistical aspects of rounding errors are given such short shrift; and it is a welcome development to have our syllabus inculcate a more systematic approach to numerical problems.

There is a vast amount of material in Scheid, such as approximation of functions, differential equations, Monte Carlo, and linear programming, that is not assigned on the syllabus but still can serve as valuable reference material. Perhaps worthy of special mention is chapter 12, which fills a need so evident in Freeman's text; that is, the common-sense and practical side of actually applying interpolation formulas.

The introduction of this new material is certainly going to make Part 3 more difficult, and it may become a real barrier to many students. It cannot help, however, but make the subject more interesting, more attractive, more "modern," to the student who really desires to learn. One might also like to say that the resulting awareness of numerical analysis would be of great benefit to the practicing actuary, but it is more likely that the introduction of these and other new (to us) mathematical methods into general actuarial use will be a slow process indeed.

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*Anthony J. Pettofrezzo, *Introductory Numerical Analysis*, pp. x, 194, D. C. Heath and Co., Boston, Mass., 1966. $7.50.

This slender volume makes a strong bid, in this reviewer's opinion, for a place in the library of any actuary who has even an occasional need to solve several simultaneous linear equations, to perform interpolations other than the straight-line variety, or to apply least-squares theory in, for instance, curve-fitting. Par-

ticularly in this last area, the sheer amount of arithmetic involved has tended to restrict actuaries, statisticians, and others to using first-degree curves; that is, straight lines of best fit or regression lines. The author brings the use of higher-degree curves for this purpose, in terms of actual results, within the grasp of a man equipped with no more than a standard desk computer.

This is, indeed, pedagogically the high point of the book (chap. 6). Tchebycheff (orthogonal) polynomials have been around for some time. However, this is the first book, of several the reviewer has looked into over a number of years, that explained these in sufficient detail that he could actually use them to shorten the process of finding curves of best fit of second or higher degree.

Now that the somewhat broader topic of numerical analysis is replacing finite differences in the actuarial syllabus, a pertinent question is whether or not this text might be appropriate as part of the required reading. Before perusing the material prescribed in the 1971 syllabus, this reviewer would have voted affirmatively. Now he would hesitate to do so, merely on the strength of an excellent treatment of a topic not even in the syllabus: orthogonal polynomials. Maybe, however, the latter *should* be in the syllabus—perhaps in Part 2, rather than in Part 3. In this case, this lucid treatment deserves serious consideration.

In outlining the material treated, one could hardly do better than the author himself in the Preface:

> The main theme of the book is interpolation from the standpoint of finite differences, least squares theory, and harmonic analysis. Some attention is paid to the methods of solution of simultaneous equations which are immediately applicable to least squares problems. The topic of summation of series is treated. Especially important to future teachers of mathematics is the chapter dealing with the relationships between the calculus of finite differences and the calculus of infinitesimals. Chapters on the numerical solutions of ordinary differential equations and approximations through Fourier series are included.

The material mentioned in the last sentence occupies the last two chapters. This is rarely used by actuaries and will be given no further attention in this review.

The reader is put on notice in the Preface that the over-all approach is theoretical rather than computer-oriented: "Such a text as this is especially well-suited for undergraduate and graduate students at colleges and universities where large-scale digital computing facilities may not be available."

This foreshadowing is borne out. For instance, Exercise 3 (on p. 22) starts off thus: "Show that the coefficients . . . are invariant under a transformation. . . ." There speaks a "pure" mathematician! (Fortunately, practitioners of applied mathematics have no corner on expository talent.) Similarly, in the same set, Exercise 6 (on p. 23) is elegant, and perhaps the result is useful as a mnemonic device. Otherwise, it seems overtheoretical for an actuary's taste.

This actuary likes the wording of the author's text considerably better than he does the choice of exercises for the student. Such a situation is preferable, especially for the individual working alone, to the converse one, where there is

an excellent list of problems—if only the student could understand how to tackle them! If the problem list is short and sometimes highly academic, as here, supplementary problem lists are often available. For this subject, an excellent list is found in one of two texts in the revised required reading—*Theory and Problems of Numerical Analysis*, by Francis Scheid. Incidentally, Scheid also discusses orthogonal polynomials, but without Pettofrezzo's clarity.

Those actuaries who teethed on Freeman's texts on finite differences might be a little disconcerted to find the interpolation formulas of Stirling and Bessel relegated to exercises, with no mention at all made of Everett's formula. They can take some comfort if they ask themselves how often, in this computer age, they ever actually use any of these. The Everett form is handy for deriving whole families of osculatory interpolation formulas; but surely a brief derivation of it could be included in the Study Note on Graduation.

Actually, any interpolation beyond simple straight-line interpolation is usually more easily done using the linear compound, or multiplier, approach, on both desk and electronic computers. Several authors, such as Beers, Greville, and the reviewer, have expounded on this, sometimes with approaches that compete with standard interpolation formulas. Pettofrezzo's failure to mention this is a minor weakness, only partially pardonable because of his disavowal of computer orientation. It would have been simple enough, when he was discussing Lagrange's interpolation formula, to have given a short table of Lagrangian multipliers for the equal-interval case, as an illustration, and to have noted that many highly complicated interpolation formulas can be recast into multiplier form, at least for constant intervals.

One of the prescribed texts in the new syllabus, *A Short Introduction to Numerical Analysis*, by M. V. Wilkes, is not guilty of this omission, even though the mention therein (on p. 32) is confined to a single paragraph. Two sentences are quoted:

> Many formulae in numerical analysis can be expressed either in terms of function values, or in terms of differences. . . . The difference form gives more insight into the action of a formula, but the Lagrangean form is more efficient when it comes to actual programming.

The author's thorough grounding in theory results in some interesting generalizations, sidelights, and references to topics not usually covered. These will be illustrated in turn. Sheppard's rules, if memory serves, were stated by Freeman only for differences at equal intervals; the author gives a generalization to the case with unequal intervals. He shows how Stirling numbers can be used as an alternative approach to Freeman's schematic devices for converting regular polynomials into factorial notation, and vice versa. In Exercise 10 (on p. 32) he introduces the notion of reciprocal differences, not usually found in elementary texts. He does not label them as such, or indicate the customary schematic approach, analogous to a table of divided differences; but the germ is there.

Furthermore, he tackles, with only partial success, the generalized problem

of least squares, rarely treated in an introductory work. In its simplest form, he attempts to replace the two regression lines—of y on x and of x on y—by a single line. Instead of two, he winds up with three, and has to apply further tests to identify the one of best fit.

Chapter 5 is a standard treatment, except for its unusual clarity, of the problem of several simultaneous linear equations. The author lists a number of approaches, ending with relaxation methods. The current actuarial syllabus cuts off after Cramer's rule, unless it has recently changed.

Perhaps this is proper, since actuaries encounter this problem far less frequently than most applied mathematicians. Also, very sophisticated computer programs are available to handle such arrays in quantity. On the other hand, it can be argued that a Society member should be capable of solving an isolated problem, where it would be inefficient to write, or even borrow, a computer program; and also that he should understand at least the general approach to computerizing such problems.

Chapter 6 has already been discussed at length and with high praise. (The reviewer disdains the Latin phrase.)

In summary, this book was not written by an actuary, nor was it written particularly with actuaries in mind. It is not even clear that the author is aware that such creatures exist. Nonetheless, there is much in it that recommends itself to actuaries, both before and after they receive their diplomas.

HARWOOD ROSSER

*J. F. Follmann, Jr., *Insurance Coverage for Mental Illness*, pp. 135, American Management Association, Inc., 1970. $5.00.

Mr. Follmann offers an extensive and comprehensive study of the current status of mental illness and therapy and the nature of insurance coverage for mental conditions. The topics covered in this book include descriptions and definitions of varying types of mental illness, utilization of the various forms of treatment, current benefit provisions used, extent of present insurance coverage, available experience of insurance carriers, and attitudes of the general public. Great emphasis is placed on the difficulties encountered in efforts to expand insurance coverage in this field. Problems described include those relating to defining the conditions to be treated; obtaining complete, appropriate, and homogeneous statistical data on frequency and duration of utilization, on costs, and on insurance experience; and the changing patterns of treatment.

The facts are presented in a well-organized descriptive form with supporting available statistics. The health actuary concerned in revising and expanding mental illness benefit designs and in developing appropriate rates will find a number of figures on frequencies and experience that he will be able to use, as well as discussion of all the elements to be considered. There is, however, no attempt made to offer precise guidelines for the best form of coverage or the anticipated experience to be encountered.

The discussion of the magnitude of mental illness conditions furnishes ample evidence of the importance of further efforts to expand coverage. Perhaps the most useful portion of the book is the chapter on the experience so far available of certain plans, although the experience reported is not sufficiently large and is too dependent on the particular plans, groups, and geographical locations involved to be the basis of confident rate-making. Nevertheless, one can at least see certain possible experiences that may emerge, which can be used as a starting point. The enormous claim cost experienced by some of the more liberal plans suggests the need for caution in designing the benefit provisions. The plans discussed also suggest the considerations of selecting benefit levels and restrictions in designing the mental illness portions of health insurance products.

A thread of optimism is apparent in this book. The figures cited point to the fact that despite the well-known restrictions placed on coverage a substantial and ever increasing amount of benefits for mental illness are being paid by insurance carriers and service organizations. Also, the author indicates an expectation that the problems impeding expansion of coverage into this area can in time be largely resolved.

DEAN E. WILLIAMS
JOSHUA JACOBS*

Sydney R. Garfield, "The Delivery of Medical Care," *Scientific American*, pp. 15–23, 1970.

"Throughout these years of remarkable medical achievement the delivery system has remained relatively unchanged as though oblivious to the great need for new forms of organization equal to the task of applying new techniques and knowledge." The traditional medical care delivery system to which Dr. Garfield, a director of the Kaiser Foundation Health Plan and Hospitals, refers has the individual physician at its core and the fee for service as the "regulator" of usage. Dr. Garfield suggests the Kaiser-Permanente plan, which does not use the fee as the regulator of flow into the delivery system, as a possible alternative to the traditional system.

Kaiser-Permanente's regulator is "health testing," which combines a detailed computerized medical history with a comprehensive panel of physiological tests administered by paramedical personnel. The health testing is then followed by health care (e.g., health education, immunization, counseling, and family planning), preventive-maintenance service (e.g., clinics for obesity, hypertension, rehabilitation, and mental health), and sick care. The first three elements of the plan are primarily areas for paramedical personnel, while only sick care is clearly the primary concern of the scarcest medical commodity, the physician. Dr. Garfield believes that this system, applied broadly in our society, could

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save at least half the time of our general practitioners, internists, and pediatricians and could, thus, both "greatly enhance our service for the sick and improve our services for the well."

The author points out that the "use of paramedical personnel with limited knowledge and limited but precise skills to relieve the physician of minor routine and repetitious tasks requires that such tasks be clearly defined and well supervised." He suggests that the proposed delivery system might "offer a solution to the hitherto insoluble problem of poverty medical care in many areas." He also believes that such a "rational new medical-care delivery system" may be the only way that the United States will be able to handle, in the long run, the increasing demands on our medical talent that are being stimulated by Medicare and Medicaid and the further stresses that may result from expansions of these government programs.

The actuary should, of course, be interested in the mortality, morbidity, and health insurance implications of Dr. Garfield's proposals. In addition, underwriters and medical directors who are experiencing increasing difficulty, especially in metropolitan areas, in finding enough examining physicians should find encouragement in Kaiser-Permanente's successful employment of paramedical personnel when they consider the use of the paramedical insurance examination facilities that are becoming available in many areas.

J. M. STEIN

William Brass *et al.*, *The Demography of Tropical Africa*, pp. 539, Princeton University Press, 1967, $15.00.

Part I contains chapters on "Characteristics of African Demographic Data" and "Methods of Analysis and Estimations," with notes on the Brass method of fertility estimation and on the effect of age misreporting. This is followed by a chapter summarizing estimates of fertility and mortality on 134 million of the 185 million people in the area under study. The study reveals an interesting pattern of high and low fertility areas which often straddle the borders of countries with varying systems of gathering data. The last chapter of Part I deals with "Marriage in African Censuses and Inquiries." Part II shows, in detail, the data and methods of estimation for Congo (Kinshasa), Sudan, Nigeria, the Portuguese territories, and all or parts of certain former French territories, particularly Upper Volta, Dahomey, Guinea, and North Cameroon.

The most interesting chapter for those particularly interested in demographic theory is chapter 3, especially the Brass method of estimating fertility. The method is a convincing attempt to overcome the misreporting of female ages, omission of long-dead children by older women, and the misjudging of the reference period for current births. The pattern of fertility is assumed to correspond to the reports of current births, but the level of fertility is estimated from the mean number of children ever born to younger women. There is also an inter-

esting discussion of stable population table technique for estimating mortality either by using standard tables (such as the Coale-Demeny tables) or by transforming a standard table into a two-parameter family by means of the transformation suggested by Brass:

$$\text{logit } p(a) = \alpha + \beta \text{ logit } p_s(a),$$

where $p_s(a) = l_a/l_0$ on the standard table, $p(a)$ is the same function on the transformed table, α and β are parameters, and logit $(x) = \frac{1}{2} \log_e [(1 - x)/x]$.

CHARLES V. SCHALLER-KELLY

*Donald X. Murray, *Successful Profit Sharing Plans: Theory and Practice*, pp. 157, Consolidated Press, Inc., Chicago, Ill., 1968. $6.00.

This book, published by the Council of Profit Sharing Industries, is a compilation of articles previously published in the Council's monthly magazine *Profit Sharing*. The stated purpose of this "handbook," according to the foreword authored by Mr. Raymond Thornburg, Chairman of the Board of COPSI, is to "introduce interested persons to one of the areas of the Council's activities, namely, its technical information service." The volume accomplishes this objective fairly well.

Thirty-four articles are included in the handbook by twenty-one authors. Fourteen of the articles are under the by-line of Mr. Donald X. Murray, who is Secretary and Director of Technical Services for the Council of Profit Sharing Industries. Most of Mr. Murray's articles present the results of surveys conducted by the Council relating to various aspects of profit sharing. The other articles are authored by individuals known in the field of employee benefits. The idea of assembling under a single cover articles relating to the very complex field of profit sharing is a commendable one, but, as might be expected, articles not intended to be published together do not fit together in a very satisfactory manner. In going through the volume, one cannot help noticing some overlapping of subject matter. In addition, the COPSI surveys which Mr. Murray treats in most of his articles are apparently taken from surveys conducted in 1966, and in several instances the fact that the information is now four years old limits its usefulness.

In spite of these shortcomings, this volume should be of considerable assistance to someone who wants an initial exposure to profit-sharing plans. The book could not be used as a reference manual, however, by a person who has had experience with profit-sharing plans. Several of the articles appear to be mere sales pitches for the services being offered by the author's firm. Others, as noted above, present survey results which, even if they were based on recent studies, are of only academic interest. With a few exceptions even the articles dealing with technical aspects of profit-sharing plans which are bound up in the Internal Revenue Code and regulations, other federal statutes, and case law provide very

little in the way of statutory citations and case citations. Accordingly, while one may find that a particular article touches on the problem with which he is faced, the article does not provide him with a convenient jumping-off point for further research. In this respect it is unfortunate that the Council of Profit Sharing Industries did not have Isidore Goodman's staff available to it when the volume was assembled.

As to specific articles, perhaps the most comprehensive and the best-assembled presentation is the article entitled "Labor Law and Profit Sharing," by James F. Duggan, a partner of McDermott, Will & Emery. Mr. Duggan considers in some detail a few of the labor law problems in profit sharing and includes an excellent discussion of the Kroger Company case. The Kroger case is summarized by Mr. Duggan in the following sentence: "The lesson that the Kroger Case teaches us is that the exclusion of bargaining unit employees from profit sharing or pension plans must not be done by automatic exclusion contained in the plan." He goes on to point out that under circumstances where there is an automatic exclusion in the plan document the union has to do nothing more than accept the contract negotiated at the bargaining table and then go to the National Labor Relations Board under the doctrine of the Kroger case to get the profit-sharing plan that it could not get at the bargaining table. The point is, according to Mr. Duggan, that the company should attempt to bargain the question of participation in its pension or profit-sharing plan and should specifically exclude only members of bargaining units that by agreement are excluded from participation in the plan.

An article of particular interest deals with the impact of the Fair Labor Standards Act on profit-sharing plans. This is an arcane area of profit sharing which is easily overlooked by nonexperts. The article is by Mr. John A. Cardon of Lee, Toomey & Kent. Mr. Cardon's two-page article reminds one of an O. Henry short story. After pointing out several pitfalls which could make it necessary for an employer to include company contributions to the profit-sharing trust in the covered employee's regular rate of pay for purposes of computing overtime pay, Mr. Cardon, in the next-to-the-last paragraph, states that if all else fails a plan can be saved by providing that the employer's contribution be allocated on the basis of the participant's total compensation including straight time, overtime, bonuses, and commissions. Such a provision, Mr. Cardon points out, automatically meets the requirements of the Fair Labor Standards Act.

Dr. James B. Zischke, of the Zischke Organization, Inc., authors an excellent article entitled "Establishing Allocation Formulas for Qualified Profit Sharing Plans." Of particular interest in Dr. Zischke's article is a table illustrating the operation of various allocation formulas on a hypothetical group of employees. It is noted that many plans find their allocation formula in a form book or adopt the so-called one-plus-one formula (one unit for each year of service and one unit for each $100 of annual compensation) merely because it was cited in

an IRS ruling some twenty years ago. Dr. Zischke illustrates eight allocation formulas. His examples should be quite helpful to an employer in selecting the most suitable one.

At least three authors devote their share of this volume to the question of what might be labeled ancillary benefits in profit-sharing plans. More specifically, these authors discuss loan provisions, partial withdrawal provisions, and cash-deferred options in profit-sharing plans. All these features add considerable flexibility to an established profit-sharing plan, and many employers may be unaware that such provisions can be incorporated in a profit-sharing program without undermining its qualified status.

The question of measuring investment results is dealt with by Mr. Peter O. Dietz in a four-page presentation. Mr. Dietz generalizes when he says, "It concerns me that so many corporate managements evade the responsibility of measuring investment results of either their pension or profit sharing plans." While this may have been a valid generalization a few decades ago, in recent years more and more corporations appear to be taking the time to sit down and determine exactly how their investment managers have been performing. Mr. Dietz stresses the significance of the potential impact on the growth of profit-sharing accounts of the rate of return earned on profit-sharing assets. He points out that investment goals and objectives should be well specified and agreed upon by all concerned, including the trustee who will have to make the investment decisions. It is unreasonable for management, Mr. Dietz implies, to complain about the trustee's performance if the trustee has not been full informed of management's objectives and investment goals, and frequently management is not able to define its investment priorities.

There is an interesting article on pass-through voting by Mr. Robert E. Hone of Arnstein, Gluck, Weitzenfeld & Minow. Mr. Hone includes a brief history of the development of the pass-through voting principle and the involvement of the New York Stock Exchange and the SEC and explains some of the rules that must be followed when pass-through voting is a problem.

In summary, the book contains some excellent articles dealing with problems of profit sharing. It is loaded with survey results which, although somewhat dated, may be used to answer the frequently asked question "What do other companies do?" It lacks continuity and is repetitious in certain areas. There is very little in the way of citations to Internal Revenue Code and other federal statutes or to case law which would assist one in further research into some of the problems discussed. The book's principal function would be to provide a general discussion of certain principles and problems in profit sharing rather than as a desk-side reference manual.

MICHAEL H. DAVIS*

* Mr. Davis, not a member of the Society, is a consultant on benefit plans in the Washington office of the Wyatt Company and a member of the District of Columbia Bar.

Price Gaines, Jr., Editor, *Cost Facts on Life Insurance*, pp. 246, The National Underwriter Company, Cincinnati, Ohio, 1969. $25.00.

This publication is a commendable attempt to describe a wide variety of net cost methods and to present some actual cost data for several of these methods. Its contents may be divided into two broad areas—a relatively short section presenting a description of the various cost methods and a history of the recent controversy concerning the value of each and a much longer section showing comparisons of the net costs on several bases for representative plans, ages, and amounts for many companies.

While the number of methods described is quite extensive, it was quite difficult to compile a complete list, especially when additional methods were being suggested as the publication was being written. For instance, this publication does not describe the present value of premiums less dividends method proposed by Mr. C. L. Trowbridge, or the modification of the level price method suggested by Mr. Clair A. Lewis, or the cost index methods suggested by Mr. Harold W. Baird. A more complete description of the various methods, but with fewer arithmetic examples, may be found in the "Report of the Joint Special Committee on Life Insurance Costs" or in Mr. William Gould's discussion of "Life Insurance Net Cost Comparisons" (*TSA*, XXI, pp. D481–D486).

In addition, no mention is made in the historical review of the current problem of how to implement the use of any method finally adopted. Mr. Nathan Jones discusses this problem on pages D194–D196 of Volume XXI of *TSA*, and Professor Stuard Schwarzchild raised the question more recently in "Ledger Statements Are Best," on pages 21 and 22 of the August 15, 1970, issue of *Insurance*.

The comparison section shows fairly detailed calculations of the net costs by three methods (traditional, equalized cost, and benefits cost) for at least one plan, age, and amount cell for each company, with additional plans, ages, and amounts shown for larger companies having several "straight" life plans.

In addition, summary figures are shown for five "leagues":

1. Companies on age-nearest-birthday basis—including waiver benefits automatically
2. Companies on age-nearest-birthday basis—not including waiver benefits automatically
3. Companies on age-last-birthday basis—including waiver benefits automatically
4. Companies on age-last-birthday basis—not including waiver benefits automatically
5. Companies issuing contracts that provide a level death benefit by suitable proportions of whole life insurance and decreasing term insurance, using the paid-up addition dividend option

These summaries show the cost results at the end of a twenty-year period *only*, using the three methods, for a much wider range of plans, ages, and amounts.

While it would be expected that every cell illustrated in detail would be included in the summary, this is not the case. For instance, the preferred whole

life and modified 2 life paid-up at 85 policies are illustrated in detail for the Prudential, but only the executive life paid-up at 90, life paid-up at 85, and modified 3 policies are included in the summary for *male* lives; the former two policies are included in the summary for *female* lives.

Also, this publication includes only one page of formulas for the cost methods used, and this page includes several undefined terms. For instance, the amount of protection is modified by premium, termination dividend, and regular dividend adjustments. The exact formula for these adjustments is *not* given, however. Thus an actuary cannot check the results for his own company exactly, and those for other companies must be accepted without verification.

This leads to consideration of what value the comparison section will have in the future. While there was some value to the current display showing variations in net cost results depending on what methods and assumptions were used, the major value of the comparison section should be derived from its publication each year using current data.

However, publication of results using several methods at several durations and using several assumptions can only lead to confusion and/or biased choice by an agent so as to optimize the results for his company. It would seem preferable to publish the results on one basis only, presumably using the recommendation of the Joint Special Committee on Life Insurance Costs. If this practice is followed, it would seem that the costs based on that method could be incorporated in current publications, such as *Flitcraft Compend*, *Unique Manual*, *Little Gem*, and the like, rather than requiring an additional publication. An alternative approach would provide for publication of the results on the "official" basis in a publication such as this but showing a much wider network of plans, ages, and amounts.

To summarize, the section providing a description of the various cost methods is somewhat incomplete and out of date, with fuller coverage given in at least two other sources. The section providing cost-comparison data will be most valuable if updated annually with current data. In this case, costs based on the "official" method could be incorporated in current publications, or results for a much wider network of plans, ages, and amounts could be shown in a publication such as this.

JAMES J. HALLORAN

**The Insurance Casebook*, 1970 Edition, pp. 426, The Underwriter Printing and Publishing Co., New York, 1970.

According to the advertisement, this is "A summary and compilation of all the important and interesting court decisions handed down in all the courts of the country, both state and federal, for the calendar year 1969. It has separate chapters with cases covering all the branches of the insurance business and the various subdivisions thereof including: casualty, surety, fire, automobile, gen-

eral liability, negligence, life, accident and health, malpractice, aviation, workmen's compensation, inland marine, marine, etc."

It is a compendium of the cases appearing in the *Weekly Underwriter* under "Insurance Court Decisions," with Charles Otey as editor, and includes an index of cases and subjects.

This volume contains a tremendous number of cases in various fields of insurance. Actuaries will miss the concise editing in the old cases in the *Transactions* and *The Record*. In general, there seems to be no attempt made by the editor to classify cases by the pertinent rules of law which lead to the decisions; rather, the headings can better be described as journalistic notes on the facts of the case. Further, the very number of cases reported without any grouping according to the importance of the case would make it virtually impossible to find the cases with potentially wide repercussions to the industry.

Although there is some interesting reading, it does not appear to this reviewer that the book is of particular use either to the serious student of law or to insurance officials interested in trend-setting court cases.

ROBERT T. JACKSON

Robert I. Mehr, *Life Insurance Theory and Practice*, pp. 916, Business Publications, Inc., 1970. $15.95.

This comprehensive volume can serve as a textbook at the college level or as a general-purpose text covering the entire range of life insurance, health insurance, and pensions. Its twenty-nine chapters take the reader through the basic principles on which insurance underwriting and contracts are based and the practical application of the principles to ordinary, industrial, and group coverages. This includes the legal and tax aspects and the principles of programming income insurance and estate planning. The final four chapters deal with the financial aspects of insurance companies and their regulation and taxation.

The author acknowledges in the Preface that his desire to discuss new ideas and practices without economizing in the treatment of essential basic topics has resulted in a book that is longer than other life insurance textbooks. "If the professor and student attempt to cover this book in a one-semester, three-hour, undergraduate course, than, to paraphrase Bacon, parts of the book are simply to be tasted, other parts are solely to be swallowed, and only a small part is to be chewed and digested." Each chapter is self-contained, however, so that whole chapters may be omitted in structuring a course to fit individual requirements. The author recommends selections of chapters for a course in employee benefit plans and for a course in life insurance planning.

Rather complete mathematical and statistical explanations have been appended to appropriate chapters to avoid complicating the chapters by bringing advanced material directly into the text or by dissociating it from the thought process by placing it at the end of the book. This reviewer was particularly

interested in the mathematical explanations and illustrations of the calculation of insurance rates and of reserves. These subjects are handled lucidly, and the material appended to the appropriate chapters is sufficiently detailed and rigorous to challenge the mind of a student who has serious occupational interests in the insurance business.

The cover of the book is its only confusing aspect. Unlike the frontispiece, the cover carries the words "Fourth Edition" below the book title. This is a misguided effort to tie the book to an earlier book with a different title of which Mr. Mehr was a coauthor and from which material was salvaged for *Life Insurance Theory and Practice*. The earlier book, *Modern Life Insurance*, was written by Robert I. Mehr and Robert W. Osler and first published in 1949. It was reviewed in Volume II of the *Transactions* on page 144. Revised editions appeared in 1956 and in 1961. This predecessor work was published by Richard D. Irwin, Inc., which is the original name of the parent company of Business Publications, Inc., the publisher of the volume here reviewed.

J. DARRISON SILLESKY

SELECT CURRENT BIBLIOGRAPHY

In compiling this list, the Committee on Review has digested only those papers which appear to be of direct interest to members of the Society of Actuaries; in doing so, the Committee offers no opinion on the views which the various articles express. The digested articles will be listed under the following subject-matter classifications: 1—"Actuarial and Other Mathematics, Statistics, Graduation"; 2—"Life Insurance and Annuities"; 3—"Health Insurance"; 4—"Social Security"; 5—"Other Topics."

ACTUARIAL AND OTHER MATHEMATICS, STATISTICS, GRADUATION

*Norman L. Johnson and Samuel Kotz, *Distributions in Statistics: Discrete Distributions*, pp. xvi, 328, Houghton Mifflin Company, Boston, 1969. $12.50.

In this first of three planned volumes on distributions in statistics, the authors have compiled a great deal of information about many of the commonly used discrete distributions. This is a book for users of statistical methods who have some knowledge of statistical technique, and thus the book does not systematically develop theory. Moments and other properties of the distributions are included, but the main thrust is toward the estimation of parameters, the development of computing formulas, and the presentation and comparison of approximation methods. Complete chapters are devoted to the most common discrete distributions, among them the binomial and Poisson. Information on compound and generalized distributions, contagious distributions, and multivariate extensions is given. A rather broad coverage of special distributions and relationships between distributions is presented. For those who wish to pursue further any of the methods described in the book, an extensive bibliography is included.

*Statistical Office of the United Nations, *Statistical Yearbook, 1967*, pp. 784, United Nations Publication No. E/F 68.XVII.1, New York, 1968. $17.50.

With text repeated in English and French, this nineteenth yearbook contains 212 tables of national statistics from 243 countries and territories.

The chapter entitled "Population" presents "tables of general interest . . . based on the corresponding major tables appearing in the United Nations *Demographic Yearbook* where . . . a full description and discussion of population and allied statistics will be found." In addition to crude birth and death rates and infant mortality rates, there appear "population by sex, rate of population increase, area and density for each country of the world: latest census and midyear estimates for 1963 and 1966." Moreover, a table in the chapter entitled "World Summary" shows estimated population at decennial intervals from 1930 through 1960, 1963, and 1966 and rate of population increase, area, and density for major regions.

The chapter entitled "Health" presents a table of the number of physicians, dentists, midwives, and pharmacists as well as the number of inhabitants per physician for each country.

Other chapters contain tables about the following topics: manpower, agriculture, forestry, fishing, industrial production, mining and quarrying, manufacturing, construction, energy, internal trade, external trade, transport, communications, consumption, balance of payments, wages and prices, national accounts, finance, public finance, international capital flow, housing, education, and mass communications.

Statistical Office of the United Nations, *Demographic Yearbook, 1967*, pp. viii, 778, United Nations Publication No. E/F 68.XIII.1, New York, 1968. $17.50.

With text repeated in English and French, this nineteenth yearbook is "one of a co-ordinated and interrelated set of periodic publications . . . designed to supply basic statistical data for demographers, economists, sociologists, and public-health workers." Statistics in thirty-two tables have been included "from almost 250 geographic entities of the world."

This issue "contains the basic tables shown every year on time trends of population, birth, marriage and divorce, estimates of large city populations, population by age and sex, births by age of mother and sex of child and marriages by age of bride and groom." A chapter of technical notes about the statistical tables comments on sources, scope, and quality of data and describes each table with its coverage and limitations. A cumulative subject-matter index covers the contents and time coverage of each of the issues of the *Demographic Yearbook* to date.

Special topics of earlier yearbooks were natality and mortality statistics (four each); population census statistics (three); general demography (two); population distribution, population censuses, ethnic and economic characteristics of population, marriage and divorce statistics, and population trends (one each). The subject featured each year is treated by special tables and text.

The topic "Mortality Statistics" is featured in tables of both 1966 and 1967 yearbooks. The 1967 issue "provides detailed cross-classifications of deaths by cause, marital status and occupation combined with age and sex; detailed statistics of infant deaths by age and sex, of infant deaths and total deaths by month of occurrence, and an historical series of expectation of life values for the years 1900–1966." The 1966 yearbook included "extended time trends of total deaths, infant deaths, late foetal deaths and perinatal deaths, . . . time series of distributions of total deaths, infant deaths and foetal deaths by age and sex for both frequencies and rates, together with deaths and death rates by cause and percentage medically certified." Special text in the 1966 yearbook was concerned with "Recent Trends of Mortality."

*Philip M. Hauser and Otis Dudley Duncan, Editors, *The Study of Population: An Inventory and Appraisal*, pp. 864, The University of Chicago Press, Chicago and London, 1959. $15.00.

An investigation, initiated in 1954 and supported by the National Science Foundation, was undertaken with the purpose of examining demography as a science and evaluating its status as a profession. Twenty-seven eminent professors and authors agreed to participate by contributing one chapter each to the study, which was edited by Philip M. Hauser and Otis Dudley Duncan.

Part I of the book provides a summary, by the editors, of demography as a science. Part II deals with the development and current status of demography. It traces the historical development and includes individual chapters devoted to France, Great Britain, Germany, Italy, Brazil, India, the Pacific area, and American demography.

Extensive treatment is given in Part III to the various elements of demography. Data (population composition, population distribution, fertility, mortality, family statistics, the working force) and the methods of obtaining them are the subject of a dozen chapters. Included in this section are numerous tables illustrating the broad range of statistics available.

In Part IV demography is compared to several related fields, analyzing their relationships and areas of overlap. Included are chapters devoted to comparisons with ecology, geography, physical anthropology, genetics, economics, and sociology.

Nathan Keyfitz and Wilhelm Flieger, *World Population: An Analysis of Vital Data*, The University of Chicago Press, Chicago, 1968, pp. xi, 672. $16.50. Reviewed in *The Actuary*, December, 1969.

Gordon R. Taylor, *The Biological Time-Bomb*, pp. 230. (The hard-cover edition from the World Publishing Company is $5.50; the New American Library paperback version is $0.95.) Reviewed in *The Actuary*, October, 1969.

G. E. Johnson and D. S. Grubbs, Jr., *The Variable Annuity*, pp. xi, 152, Research and Review Service of America, Inc., Indianapolis, 1967. Reviewed in *The Actuary*, June, 1968.

Life Insurance and Annuities

**Annals of Life Insurance Medicine*, Vol. 3, pp. 272, Springer-Verlag, New York, 1967; Vol. 4, pp. 217, Springer-Verlag, 1969.

The purpose of these publications has already been cited. Digests of Volumes 1 and 2 were printed in Volumes XV (p. 619) and XVII (p. 140), respectively, of the *Transactions*.

Volume 3 contains fifteen chapters; as in prior volumes emphasis is given to the area of cardiovascular-renal conditions. Several of the contributions were published in other sources. Among the original contributions are chapters "A Life Insurer's Interpretation of Survival Rates," by Marx; "The Significance of Heart Size in Diagnosis and Prognosis," by Reindell, Gebhardt, and Konig; and "The Long Term Prognosis of Diabetes Mellitus," by Constam.

Volume 4 contains eleven chapters, with emphasis again on cardiovascular-renal conditions. Among the original contributions are chapters "An Investigation into the Validity of the Multiple Table Hypothesis as a Basis for the Underwriting of Sub-

standard Risks in Life Assurance," by Kreis; "Right Bundle Branch Block," by Holzmann; "A Long Term Study of Insured and Declined Diabetics," by Goodkin and Wolloch; and "The Prognosis of Luch Sarcoidosis on the Basis of Catamnestic Investigations," by Wurm, Ewert, and Romacker.

Health Insurance

The American Assembly, Columbia University, *The Health of Americans*, pp. vii, 209, Prentice-Hall, 1970.

The American Assembly was established by Dwight D. Eisenhower at Columbia University in 1950. It holds nonpartisan meetings and publishes authoritative books to illuminate issues of United States policy. At least two national programs are initiated each year. *The Health of Americans* is a collection of the seven background papers for the Arden House Assembly of April 23–26, 1970. The Assembly, a heterogeneous group of some seventy laymen and health professionals, thought and talked about the health of Americans for three days and then declared their views in a summary report. The report was published as a pamphlet and may be had from the American Assembly. *The Health of Americans* is meant for the general public and for use as background reading for all regional American Assemblies held across the nation under the sponsorship of other educational institutions.

The editor, Boisfeuillet Jones, begins his introduction as follows: "The health of Americans is better than ever before, as we enter the last three decades of the twentieth century. But our health could and should be much better—we demand it and expect it. Why do we not have it? Seven authorities explain why in this book." The chapter headings and the authors of the individual chapters are as follows:

1. Human Development, by Julius B. Richmond
2. Health Assessment, by William H. Stewart
3. Mental Health, by Howard P. Rome
4. Health Knowledge, by William N. Hubbard, Jr.
5. Health Protection, by James L. Goddard
6. Health Care Delivery, by James Z. Appel
7. Health Care Cost, by Herman M. Somers

U.S. National Center for Health Statistics, *Synthetic State Estimates of Disability Derived from the National Health Survey*, Public Health Service Publication No. 1759, Washington, 1968. Reviewed in *The Actuary*, June, 1968.

Robert J. Myers, *Hospital Utilization and Average Daily Hospital Costs for Persons Aged 65 and Over as Indicated by Data under the Hospital Insurance Program and from the American Hospital Association*, "Actuarial Note No. 61," pp. 4, Social Security Administration, Washington, September, 1969. Reviewed in *The Actuary*, January, 1970.

Social Security

Social Security Programs throughout the World, 1969, pp. xxx, 249, Social Security Administration, Washington, 1970. $2.75.

This book gives country summaries of social security legislation in effect in 1969. It covers 124 countries and presents concise information on coverage, source of funds,

types of benefits, and the administrative aspects of the various programs. As is customary in publications of this kind, social security is said to comprise the following programs: old age, invalidity, and death; sickness and maternity; work injury; unemployment; and family allowances.

Bertram Oppal and Margaret A. Lannen, *Present Values of OASI Benefits in Current Payment Status, 1968*, "Actuarial Study No. 66," pp. 24, Social Security Administration, Washington, April, 1969. Reviewed in *The Actuary*, November, 1969.

Robert J. Myers, *SMI Benefit Experience for 1966–68 as Shown on Payment Records*, "Actuarial Note No. 55," pp. 4, Social Security Administration, Washington, August, 1969. Reviewed in *The Actuary*, November, 1969.

Robert J. Myers, *Accrued Cost of SMI Program for 1966 and 1967*, "Actuarial Note No. 56," pp. 3, Social Security Administration, Washington, August, 1969. Reviewed in *The Actuary*, November, 1969.

Robert J. Myers, *Current Experience of SMI Program on a "Cash" Basis*, "Actuarial Note No. 57," pp. 2, Social Security Administration, Washington, August, 1969. Reviewed in *The Actuary*, November, 1969.

F. Bayo, *Retirement Experience of Old Age Beneficiaries, 1958–68*, "Actuarial Note No. 59," pp. 3, Social Security Administration, Washington, August, 1969. Reviewed in *The Actuary*, November, 1969.

Robert J. Myers, *Comparison of Medicare Expenditures with Estimates, First Three Years of Operation*, "Actuarial Note No. 60," pp. 2, Social Security Administration, Washington, August, 1969. Reviewed in *The Actuary*, March, 1970.

Maurice C. Hart, *The Social Security Benefit Formula*, "Actuarial Note No. 64," pp. 9, Social Security Administration, Washington, January, 1970. Reviewed in *The Actuary*, September, 1970.

Life Insurance Equivalents of Railroad Retirement Survivor Benefits, "RRB Actuarial Note No. 2-69," pp. 6, Railroad Retirement Board, Chicago, April, 1969. Reviewed in *The Actuary*, March, 1970.

Cost of Crediting Prior Service under the Railroad Retirement Act, "RRB Actuarial Note No. 3-69," pp. 4, Railroad Retirement Board, Chicago, August, 1969. Reviewed in *The Actuary*, March, 1970.

Other Topics

Mary Eleanor Spear, *Practical Charting Techniques*, pp. 368, McGraw-Hill Book Company, 1969.

This book is designed to serve as a practical manual for those who make, use, or view charts, maps, and diagrams. The author's basic premise is that the response to a visual presentation will determine its value and that, if maximum response is the objective, the design of a visual for a nontechnical audience should be guided by the fundamental rule, "Keep it simple."

The text includes 276 illustrations. The subject matter of the charts covers a wide range of economic and statistical data. Judicious treatment of artwork is illustrated,

and examples of illusions that may result in cheating by charting are given. The text also comments on how illusions may be used to advantage in displays and exhibits. Shortcuts to layouts and the practical use of commercial materials are illustrated. Simple formulas and tables of ratios, diameters, and square and cube roots are included to be used in determining the size of layouts or of graphic symbols. Other tables show how data should be prepared for drafting-room plotting, how indexes are obtained for selected base years, and why particular types of charts are suited to certain kinds of data.

Some of the topics discussed in the text are illustrating a nonstatistical written report; charting and designing pictographs; changing a statistical analysis into a popular presentation; constructing charts showing the organization of businesses, industries, and governments; using maps as a basis for an economic survey; preparing visuals for reproduction or projection; planning color schemes; and using panels and kits for displays.

*Conference Board of Mathematical Sciences, *Aspects of Undergraduate Training in the Mathematical Sciences*, Volume I, pp. 164; *Aspects of Graduate Training in the Mathematical Sciences*, Volume II, pp. 140; *Aspects of Professional Work in the Mathematical Sciences*, Volume III, pp. 144.

The first two volumes represent the results of surveys taken since 1961 of many universities around the country in regard to the academic credentials of their faculties, the structure of their course offerings for math majors (undergraduate) and Ph.D. candidates (graduate), and the academic backgrounds of their students. The third volume traces the graduating Ph.D.'s in mathematics to the types of institutions they choose to work for after graduating. Many charts are contained in each of the three volumes indicating the trends of course offerings in mathematics in the educational institutions today and the types of career work chosen by students earning Ph.D.'s in mathematics.

John B. La Macchia, Jr., *Adjusting Life Insurance Company Earnings*, Standard Analytical Service, Inc., Insurance Investors Advisory Division, St. Louis, Mo. $7.50. Reviewed in *The Actuary*, January, 1970.

Richard A. Brealey, *An Introduction to Risk and Return from Common Stocks*, pp. 150, MIT Press, Cambridge, Mass., 1969. $5.95. Reviewed in *The Actuary*, January, 1970.

Frederic P. Withington, *The Real Computer: Its Influence, Uses and Effects*, Addison-Wesley, 1969. $9.95. Reviewed in *The Actuary*, October, 1970.

U.S. Department of Health, Education, and Welfare, *Toward a Social Report*, pp. 101, Government Printing Office, Washington, 1970. $0.55. Reviewed in *The Actuary*, December, 1969.

Ernest Dale, *Management: Theory and Practice*, Second Edition, pp. 786, McGraw-Hill Book Company. $10.50. Reviewed in *The Actuary*, December, 1969.

William O. Douglas, *Points of Rebellion*, pp. 97, Vintage Books, New York, 1970. $1.95. Reviewed in *The Actuary*, May, 1970.

REVIEWS FROM "THE JOURNAL OF THE INSTITUTE OF ACTUARIES"

Reviews in Vol. 95, Part III, No. 402

R. E. Beard, T. Pentikainen, and E. Pesonen, *Risk Theory*, pp. xiv, 191, Methuen & Co., Ltd. ("Methuen's Monographs"), London, 1969. (Distributed in the United States by Barnes & Noble, Inc.)

NOTE.—The *Journal*, in addition to actuarial papers and discussion, contains digests of articles, papers, and publications of actuarial interest and "Notes on Other Actuarial Journals."