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BOOK REVIEWS AND NOTICES*

*Floyd S. Harper and Lewis C. Workman, *Fundamental Mathematics of Life Insurance*, pp. xiii, 394, published for Life Office Management Association by Richard D. Irwin, Inc., Homewood, Ill., and Irwin-Dorsey, Ltd., Georgetown, Ont., 1970, \$10.

The authors of this book have applied the principles of programmed learning so effectively to elementary actuarial science that copies of this volume should be stored in a time capsule, so that, when an archeologist of a future civilization endeavors to learn our concepts of life insurance, he may be able to do so. The first half of this book is an introduction to the subject. In it the student is introduced to arithmetic, the equation, and the elements of compound interest theory. The following quotation from page 3 illustrates the style:

When an item is divided into four equal parts, each part is known as one fourth of the item and is represented by the symbol

$$\frac{1}{4}$$

The number below the line indicates division into "fourths." This number is known as the *denominator* and tells how many parts there are all together. The number above the line is known as the *numerator*; it tells how many of the parts are being considered. The entire symbol is known as a *fraction*.

Fractions are, in fact, a way of indicating division. For example, $1/4$ indicates the division of 1 by 4; $3/4$ indicates the division of 3 by 4.

The theory of life contingencies is introduced on page 131 as follows:

PROBABILITIES OF LIVING OR DYING IN ONE YEAR. The probability that a person age x will live to reach $(x + 1)$ is represented by the symbol

$$p_x$$

That is, p with a subscript x . It is read " p sub x " or simply " p_x ." An example would be

$$p_{43}$$

which is read " p sub 43" or " p_{43} ." It means the probability that a person age 43 will live to reach age 44, that is, will be alive for at least one whole year.

In general terms, it may be said that if the number living at age $(x + 1)$ is divided by the number living at age x , the result will be the probability that a person age x will live to reach age $(x + 1)$. In equation form, this is written

$$p_x = \frac{l_{x+1}}{l_x}$$

The text continues to cover the subjects of life annuities, life insurance premiums, net level reserves, modified reserves, nonforfeiture values, and dividends in this careful, methodical manner. The authors are to be congratulated

* 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*.

upon having written an introduction to this complex subject which can be studied at home without an instructor.

Those of us in the Society will be disappointed to learn that the subject has been treated without any reference to the role of the actuary. We may also be a little concerned about the reference to reserves associated with individual policies. Accuracy is important in a text of this type. This reviewer noted errors on pages 371 and 379. The value of V^{18} and the answer to question 3 following section 3.5 are incorrect. This is unfortunate.

This LOMA publication is a worthy successor to the series of elementary life contingency textbooks initiated in this country by Nathan Willey back in the 1870's.

JOSEPH C. NOBACK

*Marjorie V. Butcher and Cecil J. Nesbitt, *Mathematics of Compound Interest*, pp. xii, 324, Ulrich's Books, Inc., Ann Arbor, Mich. 1971, \$9.50.

Mrs. Butcher and Dr. Nesbitt have presented a mathematically comprehensive and precise treatment of a subject which is basic to our traditional approach to the study of life contingencies and, otherwise, is an important concomitant in the borrowing and lending process affecting individuals, governments and corporations. Both Mrs. Butcher, who is an Associate of the Society and Lecturer in Mathematics at Trinity College, and Dr. Nesbitt, F.S.A. and Professor of Mathematics, University of Michigan, have used this book in their classrooms for several years, and its development has been benefited by constructive criticism and suggestions of students and faculty colleagues.

Although the authors stress a full mathematical development of the subject, liberal use is made of line diagrams, checks for reasonableness, and general reasoning. Actuaries who have been exposed to these techniques will appreciate their importance in understanding mathematical formulations of "real world" concepts and in explaining them to nonmathematicians. In addition, as ideas are introduced in the book, one or more clear examples of their applications are given to augment the mathematical development.

The first two chapters cover rates of interest and discount rates as they apply to accumulating and discounting single sums. Relationships among various equivalent rates, including the force of interest, are fully explored and are summarized in table form. This table, although complete and accurate, epitomizes the difficulty this reviewer had in reading many of the mathematical formulas presented in the book. The text was prepared for duplicating using a standard typewriter, and exponential and fractional expressions and line diagrams are frequently difficult to follow, particularly where the text is crowded together.

Chapter 3 develops the annuity certain from first principles, using line diagrams and general reasoning to aid the reader's comprehension of the process. The authors' treatment of annuities with payment periods differing from the

interest period and varying payment annuities using line diagrams is especially lucid and should prove to be of help to students who have difficulty visualizing these forms when they are dealt with strictly from a mathematical point of view.

Chapters 4 and 5 cover applications of annuities to standard amortization and sinking-fund methods of debt repayment and methods of price and yield determinations for bonds. The several alternative approaches presented in the book provide a comprehensive background for coping with these problems. As an example of the variety of techniques employed, Makeham's bond price formula is developed from a basic bond formula by considering price as a linear function of g , the coupon rate based on redemption value, and using elementary analytic geometry and bond theory to determine the equation of the line.

Finally, Chapter 6 discusses several subjects of current interest, including (1) the impact of computer methods on classical theory, (2) methods for computer solution of problems, (3) solving for the interest rate, (4) truth-in-lending legislation, and (5) immunization of a large fund from losses due to variations in future interest rates. This chapter is a valuable supplement to material traditionally covered in compound interest texts.

In general the book requires a good background in mathematics through calculus, with a fairly high level of ability. An introduction to finite differences is provided in an appendix for those who are not acquainted with the subject or who need a brief review.

An outstanding feature of this book is the number and variety of problems at the ends of Chapters 1-5. In all, 515 problems are included, with the easier, straightforward problems presented first in a basic list, followed by more challenging problems in a supplementary section. Answers are given for the basic list of problems.

In summary, I would recommend this book to students of Part 3 as a rich source of problems and to students, members of the Society of Actuaries, and teachers for its clear, comprehensive, and up-to-date treatment of the subject. It should prove to be an important resource and a valuable addition to finance and actuarial libraries.

W. R. ADAMS

*D. W. A. Donald, *Compound Interest and Annuities-Certain* (2d ed.), pp. 312, Cambridge University Press, Cambridge, 1970, \$5.00.

There have been very few changes in the second edition of this well-known publication. Twelve pages have been added to Chapter 10, ("Taxation"), and some of the material in this chapter has been rewritten to take into account the introduction of a capital gains tax in Great Britain in 1965. The only other change of any consequence is a change to decimal currency from the former pounds, shillings, and pence. Otherwise, word for word and page for page, the present work is essentially a reprinting of the earlier edition (1953).

American actuarial students will welcome the change to pounds and pence (100 new pence per pound). The former currency tended to create a psychological block in the minds of many students. The two instances in the second edition in which expressions like "25p%" are used should not prove to be an insurmountable obstacle to the serious student.

The book is not entirely suitable as a primary text. It contains too few exercises, and several of the chapters are of little interest or value to American students. On the other hand, it is a very good reference book, particularly in its emphasis on the calculus and in many interesting example problems.¹

ERNEST R. VOGT

*P. R. Cox, *Demography* (4th ed.), pp. ix, 470, published for the Institute of Actuaries by the Cambridge University Press, 1970, \$9.50.

The third edition of this well-known demography text was reviewed by Mortimer Spiegelman in *TSA*, XII (1960), 206-8. In the fourth edition the concept of exposure to risk and the construction and use of life and other decremental tables are included for the first time, while a chapter on sickness and disability data has been omitted. The use of population mathematics, including stochastic processes, has been expanded and material on family planning, population policy, and distribution and depletion of resources added. The net result of deletions, revisions, and new additions is the expansion of the text by 124 pages over the earlier edition.

Society members who have prepared for the demography part of their examinations with Mortimer Spiegelman's *Introduction to Demography* will find much of the first seventeen chapters familiar. Theoretical derivations are supplemented by excellent numerical examples using primarily data of Britain but also statistics from many other countries.

The history of our profession is no longer part of the required readings. The subject is not popular, and such material is equally neglected in other professional callings. Chapter 18 briefly covers the history of demography, Chapter 19 the evolution of populations, Chapter 20 the population of Britain from 1800 to 1970, and Chapter 21 the demography of other countries and regions. Population theories, projections, and distribution; mortality, marriage, and fertility trends; and economic, social class, and environmental effects are considered.

With ecology and the problems of urbanization commanding much attention these days, a reading of Cox's Chapter 22 ("Population and Resources"), Chapter 23 ("Issues of Population Policy"), and Chapter 24 ("The General Population Outlook") will enable the reader to take a better part in the general debate determining public policy in these areas.

FREDERIC SELTZER

¹ See review of earlier edition by Carl H. Fischer, *TSA*, VI, 617-19.

*Conference Board of the Mathematical Sciences (Thomas L. Saaty and F. Joachim Weyl, eds.), *The Spirit and the Uses of the Mathematical Sciences*, pp. x, 301, McGraw-Hill Book Co., Inc., 1969, \$8.95, hardback; \$3.95, paperback.

The purpose of this collection of articles is to provide for the literate layman some insight into mathematics as a basic form of creative thought and as an essential tool for man's understanding and adaptation of his environment. The book will be of interest to these actuaries who are curious about what it is like to be a mathematician. (In the hierarchy of mathematics, most actuaries would rank well below applied mathematicians—perhaps somewhere between “insurance engineers” and “literate laymen.”)

A recurring theme will be apparent to the careful reader—the universality of mathematics, its “unreasonable effectiveness,” the fact that similar mathematical concepts turn up in entirely unexpected places. One example is the calculus, originally created to handle problems concerning physical phenomena and later applied to develop the theory of mortality and its ramifications. Another is the concept of reliability: How can systems be built which function more reliably than their parts? One way is by artful redundancy in structure; another is by the artful coding of transmissions. On the other hand, nature achieves it by having parts of the system perform more than a single function. The actuary might expect this problem to appear here in the context of computer design or the organization of a business enterprise. Not so; it is developed here as a crucial problem of mathematical biology.

I suspect that even literate laymen will find some of the pieces difficult to follow. The casual mathematically minded reader is likely to find his interest maintained by the intriguing bits of mathematical lore and the frequently provocative questions which are raised, many of which have considerable relevance for the actuarial profession. For example, consider the following, reading “actuary” in place of “mathematician”:

- (i) If a senior mathematician expects his colleagues to be productive mathematicians, he should practice what he preaches and devote a portion of his time to reading and thinking about matters of professional concern, if possible publishing his conclusions.
- (ii) For students to fully appreciate the aesthetics of mathematical thought, they must be exposed to its elegant aspects as well as to the drudgery of computation—and the earlier the better.
- (iii) Mathematics is the science of skillful manipulation of concepts and rules invented just for this purpose.
- (iv) A mathematician is potentially a philosopher, a scientist, an engineer, and an artist.
- (v) The great mathematician fully, almost ruthlessly, exploits the domain of permissible reasoning, and skirts the impermissible.

In this vein it is appropriate to repeat David Hilbert's famous criterion: "A branch of science is full of life as long as it offers an abundance of problems; a lack of problems is a sign of death."

DAVID S. WILLIAMS

*John D. Long, *Ethics, Morality, and Insurance*, pp. xvi, 308, Bureau of Business Research, Graduate School of Business, Indiana University, 1971.

This is a fascinating and thought-provoking treatment of a subject which, as the author ably shows, has profound implications for the future of insurance. Beginning with a description of the ethical foundations of insurance, he proceeds to define and examine the major forces and developments that might affect insurance over the long-range future through resulting changes in either morality or ethics. One is impressed not only with the author's broad scope of knowledge in such diverse but relevant fields as economics, philosophy, biology, cybernetics, and others but also with the skillful manner in which he has drawn upon this knowledge to weave a compelling and sobering account of the possible future of insurance in the emerging ethical and moral environment.

The first two chapters develop the foundation for later speculations. Chapter 1 deals briefly with the concepts of ethics and morality and other introductory matters, while Chapter 2 describes the nature and character of insurance, including the ethical pillars upon which it rests. More specifically, in Chapter 2 the author discusses the redistributive nature of insurance and then sketches the insuring process in considerable detail and the institutional apparatus necessary to support it. Included as part of the apparatus are private property, a consumption surplus, and a power system. The author also develops tables of insurance premiums, population, and gross national product, for major nations and groups of nations, to support the thesis that differences between countries in the use of insurance are at least partially due to differences in their ethical and moral characteristics. As the author himself recognizes, this support, while suggestive, is tenuous at best. The remainder of the chapter is devoted to a thorough and well-formulated exposition of the ethical pillars of insurance, which are taken to be achievement, acquisitiveness, preservation, apprehension, honesty, obedience, tradition, personal responsibility, and charity.

The author obviously felt constrained to provide sufficient detail about the nature of insurance and the insuring process in Chapter 2 to provide the layman with a solid foundation for the remainder of the book. As a consequence, informed insurance professionals may find their interest flagging at this point, but stimulating chapters lie ahead.

Chapters 3-8 describe major factors likely to affect insurance: population pressures, inflation, changes in leisure and technology, and ethical relativism. These are so well developed and documented with appropriate references that even readers familiar with these subjects will find the accounts absorbing.

In Chapter 3, on population prospects, after a historical treatment of population growth illustrated by two charts which show dramatically the growth from the Old Stone Age to the present, the author examines the long-range outlook, including maximum potential and population control. Among the many interesting references here are a summary of Malthus's *Essay on Population* and reports on a number of insect and animal experiments, with possible inferences. The chapter concludes with various estimates of world and United States population and the author's sobering observation that even the lowest represent a frightening increase in human population.

The pressures resulting from increased population density are having real and progressively serious effects on insurance in terms of rising crime losses, social and political pressure to subsidize high insurance risks, and disenchantment with and curtailment of tort liability insurance. These and other possible consequences of population growth are discussed in Chapter 4. A section on crime losses contains some interesting information on frequencies and trends of various crimes, degree of repetition among offenders, and the severe biological and behavioral effects on animals placed in high-density confinement in laboratory experiments. In the section on insurance as an instrument of social policy the author discourses on the possibility that changes in ethics and morality might lead to further legislation for wider spreading of losses on high risks. Cited as examples are the Urban Property and Reinsurance Act of 1968 and the so-called FAIR plans (fair access to insurance requirements). Regarding diminished use of tort liability insurance, the author points out the difficulty of determining fault in an environment of increasing crowdedness with its multiplication of human contacts, accidents, dangers, and so on. As a result, the trend away from tort liability insurance, already evident in no-fault auto insurance, is likely to continue.

After a brief discussion in Chapter 5 of the nature of inflation, the author examines the insidious effect of inflation on the ethical pillars. His account is replete with references ranging from excerpts from a historical account of inflation during the later days of the Roman Empire to a statement by Lenin that the best way to destroy the capitalist system was to debauch the currency. This is followed by a look at the historical record for the United States and for sixty-one major countries from 1953 to 1966.

On balance, not much sustained inflation occurred in this country prior to World War I; secular inflation in the United States above 2 per cent is a post-World War II phenomenon. With the exception of Canada, every heavily industrialized nation in the free world has experienced recent inflation averaging at least 2 per cent per year. While far below the rates of 39 per cent for Brazil and 34 per cent for Chile, to mention a few of the countries shown in the author's tables, even this relatively low level of inflation has serious implications if continued as a persistent long-term trend. The author then speculates about the trend in prices over the remainder of the century. Among the factors contributing to continued

secular inflation are the national commitment to full employment under the Employment Act of 1946, public tolerance of chronic deficits, the growing supply of money, the power of organized labor, and the increasing importance of service enterprises. The natural, if not inescapable, conclusion is that secular inflation is likely to continue at a rate which will have unfavorable effects on the ethics and morals of our society, with consequent serious implications for insurance.

We learn in Chapter 6 that leisure, too, has its implications for ethics, morality, and insurance. Much of this chapter is devoted to an appraisal of energy requirements and resources and to adducing the case for increased productivity and leisure resulting from lower unit costs of energy. There is an interesting discussion of the ethics of leisure and work, touching upon such societies and times as those of the ancient Greeks and the early Christians, the Reformation, and the Renaissance and including a reference to the Protestant ethic. Three possible changes in behavior have important implications for insurance. First, many individuals will use their increased leisure to become emotionally committed to numerous causes, thereby becoming embroiled in human conflict (race relations and campus unrest are given as examples); second, there is likely to be a move toward increased gambling, with an insidious effect on the ethical pillars; and, third, there is a tendency toward profligacy, with obvious consequences to insurance.

Chapter 7, on technology, speculates that advances in certain fields may contribute to a weakened sense of human dignity, by causing man to see himself increasingly at the mercy of events and processes beyond his control and understanding and thus leading to feelings of resignation and futility that could fundamentally affect ethics and behavior, with profound consequences for insurance. The author then outlines current studies in a wide variety of fields, beginning with physics and astronomy, from research into the most elementary particles of matter at one extreme to the nature of the universe at the other. A section on biology which follows, covering tissue transplants, molecular biology, drugs, and surgery, is particularly staggering in its implications. The chapter concludes with a fairly lengthy treatment of cybernetics and its ramifications with respect to ethics, morality, and insurance.

Up to this point the author has dealt with changes in ethics and morality emanating from external forces. He now proceeds in Chapter 8 to discuss alterations in ethics and morality arising from an observable trend away from absolutism toward relativism in ethical thought. There follows a delightful, succinct review of ethical thought from ancient times to the present, including that of Socrates, Epicurus, Spinoza, and Kant, down through Fletcher. The author discusses some characteristics that seem to be evolving from the new behavior, such as antiauthoritarianism, impatience, and willingness to compromise. His speculations on future behavior and consequences to insurance of the trend to relativism are very appropos.

The concluding chapter is devoted to the all-important question of what can be done and who can take action, and to a six-point program of persuasion by the insurance industry. While this program seems to encompass virtually all that the insurance industry could do, one must be pardoned for a feeling of hopelessness that any such program by itself can significantly alter the course or lessen the impact of forces the enormity and compelling nature of which the author has so well dramatized. Nevertheless, we take heart from the only too apt words in the dedication to the author's wife, ". . . and her optimism about the future," and feel that, taking courage to change the things we can, the industry should consider expanding its efforts along the lines of the author's "program of persuasion."

ELMER R. BENEDICT

*Advisory Council on Social Security, *Reports of the 1971 Advisory Council on Social Security*, House Document No. 92-80, 92d Congress, pp. 183, U.S. Government Printing Office, Washington, March 31, 1971.

This extensive report, required by law to be submitted by January 1, 1971, was completed and released some three months late because legislation on social security was pending in Congress. Even so, the Advisory Council did not have a firm base on which to build, because legislation was even then being actively considered by the House Committee on Ways and Means.

The report is, in essence, divided into three separate reports, dealing with social security cash benefits, Medicare, and financing. To it are appended the dissenting statements of several council members and four appendixes. The latter include a report of the Office of the Actuary and a report of a panel of actuaries and economists that was created to review the cost estimates and the financial policy.

This review will particularly stress the recommendations made with respect to financing policies and actuarial cost-estimating methodology and techniques.

COMPOSITION OF COUNCIL

The Social Security Act provides that every four years—just after a new administration takes office—an Advisory Council should be established, with a broad mandate to study and recommend on all phases of the Social Security Act. There have been similar Advisory Councils in past years (although not always on a four-year basis), extending back to the one which reported in 1939. In the early years the views of the Advisory Council greatly influenced legislative action. More recently this has not been the case, and legislation has developed with little effect exerted thereon by the recommendations of the Advisory Council. One reason for this has been the growing knowledge and expertise of the congressional committees which deal with social security.

The thirteen members, appointed by the secretary of health, education,

and welfare, included seven representatives of the general public, three representatives from labor, and three representatives from business. The labor representatives were two high officials of AFL-CIO international unions and the full-time top social security staff official of the AFL-CIO. The three business members were high-ranking executives of large corporations and, as has been the case in every past Advisory Council, included an actuary (Charles A. Siegfried, F.S.A.).

The seven public members were heavily weighted on what might be called the liberal side, despite the fact that the Nixon administration is generally thought to be on the conservative or moderate side. Thus, on seeing the initial constitution of the council, one could safely have predicted in advance that its recommendations would be for a significant expansion of the program. Such were the actual results!

RECOMMENDATIONS ON CASH BENEFITS

The Advisory Council made a considerable number of recommendations for expanding the cash benefits (OASDI) program. The changes proposed represented an over-all cost increase of about 12 per cent. A number of these recommendations merely followed what had been proposed by the administration in 1969 and/or what had been included by the Congress in the legislation enacted by each chamber in 1970 but had not been agreed upon by both bodies (indicated in the following listing by asterisks):

1. Automatic adjustment of benefit amounts, the earnings (or retirement) test, and the taxable earnings base.*
2. Earnings base of \$9,000 in 1972* and \$12,000 in 1974.
3. Adjustment of maximum family benefits to the same extent as primary and related benefits when general benefit increases occur.*
4. Increase in the maximum on the lump-sum death payment from \$255, which has prevailed since 1952, by having it related to the maximum family benefit for monthly benefits.
5. A person eligible both as a retired worker and as a spouse for reduced benefits because of early retirement should be allowed to choose only one set of benefits immediately and take the other in full later.*
6. The same benefit computation point for men as for women for old age benefits (now 65 for men and 62 for women).*
7. Increase in the annual exempt amount in the earnings test from \$1,680 to \$2,000 and application of the "\$1 for \$2" reduction basis indefinitely beyond that point (instead of only for the first \$1,200).*
8. Widow's and widower's benefits at a rate of 100 per cent of the primary benefit for those who come on the roll at or after age 65, with graded amounts down to 82½ per cent for age 62 at claim (and with the proviso that such survivor benefit shall not exceed the benefit that the deceased worker was receiving or could have received).*
9. Elimination of the requirement of recency of employment (namely, 20 quarters of coverage out of the last 40 quarters) for disability benefits, so that persons long out of the labor market would be eligible if they had fully insured status.

10. Reduction in the waiting period for disability benefits by 1 month, so that there would be an average period of time of about $6\frac{1}{2}$ months (instead of the present $7\frac{1}{2}$ months) between the date the disability occurs and the date the first check can be received.
11. Liberalized definition of disability for workers aged 55 and over (close to a "usual occupation" definition).
12. Liberalization of the workmen's compensation offset for disability beneficiaries, so that the 80 per cent limitation would be measured using the highest annual earnings in the last 6 years (instead of the average earnings in the last 5 years).
13. Monthly benefits at full rates for disabled spouses and for disabled widows and widowers.
14. Disabled child benefits if the disability began before age 22 (at present this limitation is age 18).*

In May the House Ways and Means Committee reported out (and the House subsequently passed) a bill containing far-ranging changes in the cash benefits program, H.R. 1. This bill included all the items above marked with an asterisk (except for a \$10,200 earnings base in 1972, instead of \$9,000) and, in addition, only two of the other items, Nos. 10 and 12.

RECOMMENDATIONS ON MEDICARE

The council made its greatest recommendations for expansion of the social security program in the field of Medicare. The administration recommendations in 1969-70 and the congressional action in the uncompleted legislation in 1970 had contained little in this area. In the aggregate, these recommendations would result, from a cost standpoint, in about a 62 per cent expansion of the Medicare program. The major changes recommended were as follows:

1. Disabled beneficiaries (disabled workers, disabled widows and widowers, and disabled "child" beneficiaries) should be covered for both hospital insurance (HI) and supplementary medical insurance (SMI).
2. Prescription drugs for use out of hospital should be covered, with a flat cost-sharing payment of \$2 for the initial prescription and \$1 for refills (in-hospital drugs have always been covered under HI).
3. SMI should be combined with HI, and both programs should be financed from two sources—payroll taxes and a government subsidy that would eventually finance one-third of the cost (with a graded-in basis from about one-fifth initially, thus initially hiding the cost impact).
4. The number of lifetime reserve hospital days under HI should be doubled, and the daily coinsurance rate should be halved.
5. A lifetime reserve of 60 days (with the same daily coinsurance as now applicable to the twenty-first to one hundredth regular days) should be provided for the extended care facility benefits under HI.

H.R. 1 also contained some significant changes in the Medicare program, but much less far-reaching ones than the above recommendations. The bill provided both HI and SMI benefit protection for disabled beneficiaries, but only after they had been on the roll for 2 years. SMI would be

continued on a voluntary, premium-paying basis, but with the same premium for the disabled as for the aged and with limitations on the increases in the premium rate which could be made as the cost of the program rose (both items resulting in the government contribution being on a higher than 50-50 basis). The number of lifetime reserve hospital days was doubled, as the council recommended, but the coinsurance rate was not changed, and lifetime reserve days were not introduced for extended care facility benefits.

RECOMMENDATIONS ON FINANCING

The council made a number of significant recommendations with regard to the financing of the cash benefits and Medicare programs and to the proper actuarial methodology. The principal recommendations in this area are given below, followed in each case by the reviewer's comments when he is not in accord.

1. The investment rules for special issues to the trust funds should be revised, so that they receive more nearly equal treatment when interest rates vary.
2. The cost estimates for the cash benefits program should be based on increasing-earnings assumptions.

This reviewer believes that this would be unsound actuarial procedure, even if automatic adjustment provisions were adopted. What it would mean, in essence, is that actuarial soundness could be wholly dependent on a perpetually continuing inflation of a certain prescribed nature; that is, the general wage level would, over a 75-year period, have to increase more rapidly, at a certain proportionately greater rate, than the price level.

It does not seem prudent to count on future favorable cost experience as a result of rising earnings to finance liberalizations of today's cash benefits or to produce a future tax schedule which is lower thereby (and thus does not truly indicate the probable emerging costs of the program). Rather, the wise course that has been followed in the past—that is, utilizing gains from rising earnings levels *after* they occur, and not *before*—should, on the whole, be continued.

This proposed procedure for the cash benefits program is now being followed for the HI program, and quite properly so, because the situation is just the reverse. Under the HI program, inflation can result in financing difficulties, and so it is prudent procedure to make the assumption that some inflationary trends will occur.

The OASDI actuarial cost estimates in the report are based on the long-range assumption that wages will rise in the future at twice the rate at which prices will increase (namely, 4.5 per cent versus 2.3 per cent). While such a 2-to-1 assumption seems reasonable—even though in recent years the ratio has been about $1\frac{1}{4}$ to 1—it does not seem to be sufficiently fiscally prudent for these purposes. The 2-to-1 assumption results in about a 17 per cent reduction in the level cost of the benefits of the program, and this is used, in part, to finance the recommended benefit liberalizations. This assumption

has great sensitivity, and even as little a change in the ratio as to $1\frac{1}{2}$ to 1 would eliminate the indicated cost savings (i.e., produce the same result as a level-earnings assumption).

Not only does a 2-to-1 ratio for the assumed increases in wages relative to the assumed increases in prices seem imprudent for OASDI cost-estimating purposes in view of the recent experience, which shows a $1\frac{1}{4}$ -to-1 ratio, but it is also imprudent in view of likely future trends. It will be remembered that this ratio reflects the factor of increasing productivity, since the increase in wage rates, on the whole, equals the increase in prices plus the increase in productivity. Although in the more distant past the productivity increases were about equal to the price increases—resulting in the foregoing ratio being 2 to 1—this may well not occur in the future.

Productivity increases are likely to be much smaller (or even nonexistent), and price increases much larger, resulting in ratios much nearer to 1 to 1. The smaller productivity increases will possibly be due to such factors as increased emphasis on ecology and antipollution measures (resulting in higher production costs for a given item) and less emphasis on work effort (the so-called nonmaterialistic “doing your own thing” philosophy of some members of our society and its indirect resulting effects on the other members).

If automatic adjustment provisions are incorporated in the program, some change in the actuarial cost-estimating procedure for the cash-benefits program may be desirable. This reviewer believes that rising-earnings and rising-benefits assumptions should be made for only a 5-year future period, with level assumptions thereafter. By this procedure, reasonable forecasts can be made as to what wages and prices will do for the short term, without there being the danger of assuming financing gains over many decades as the result of continuing inflation.

3. The principal cost estimate for developing the financing should be the one that is based on the “single best” set of assumptions, instead of an intermediate estimate that is an average of a low-cost estimate and a high-cost estimate.

This reviewer believes that it is not really possible to make a “single best” assumption for any of the cost factors involved. Nobody is that well informed, and one is merely deceiving oneself by this procedure.

4. The HI cost estimates should be based on a 10-year valuation period (instead of a 25-year one).

This reviewer disagrees strongly with this recommendation, since it really hides the true costs of the program. It should be emphasized that the use of a 25-year valuation period, as compared with a 10-year period, has *no* effect on the contribution schedule developed for the next 10 years if pay-as-you-go financing is used; exactly the same schedule will be derived for the next decade in either case, but the 25-year basis has the advantage of indicating cost trends after 10 years.

5. The financing of all programs should be on a current-cost basis, with the trust funds maintained at a level of about one year's outgo.

It is very disappointing that no dollar figures on a projection basis are shown in the report. Thus the reader cannot judge for himself the validity of the contribution rates recommended, the size of the trust funds under the criteria developed, and so on. Even under the optimistic actuarial techniques used by the council, the ultimate combined employer-employee tax rate for cash benefits and HI benefits together would be about 15 per cent (or more)—and would be 17 per cent (or more) if there were no government subsidy.

In the opinion of this reviewer, the contribution schedules developed by the council show rates that are too low, because they appear to be based only on the outgo as a percentage of effective taxable payroll each year and thus do not allow for the necessary increase in the trust-fund balances so that they maintain a size equal to one year's outgo. It is realized that the interest earnings of the trust fund will, under this procedure, be used to build up the trust fund balance, but it is questionable whether the $5\frac{1}{2}$ per cent rate assumed will be sufficient to maintain the required size (and also whether $5\frac{1}{2}$ per cent is too high over the long run, when the annual increase in the price level is assumed to be only 2.3 per cent).

6. The combined HI-SMI program should be financed with a government contribution equal to one-third of the total cost. In the first few years (under the "camel's nose in the tent" approach) this proportion should be lower, beginning at one-fifth.

This reviewer believes that the HI and SMI programs should not be combined and especially that no government subsidy should be introduced.

MINORITY AND INDIVIDUAL VIEWS

Unlike previous councils, this one resulted in many separate individual views. It is noteworthy that the press release on the council's report, prepared by the Department of Health, Education, and Welfare, did not contain any detail at all on these dissenting views.

The labor members, joined by the late Whitney M. Young, Jr., recommended an even greater expansion of the cash benefits program than did the council (15 per cent benefit increase, with a \$100 monthly minimum; more liberal definition of disability; and liberalized benefit computation methods). This would be financed by the introduction of a government subsidy of one-third of the total cost. Interestingly, they opposed the introduction of automatic adjustment provisions *before* the benefit level is increased substantially.

The business members, joined by Dwight L. Wilbur, M.D. (past president of the American Medical Association), opposed the automatic adjustment provisions. Two of the business members, again joined by Dr. Wilbur, also opposed the significant general expansion of the program that the council recommended.

It is interesting to note the action of the council on the automatic adjustment provisions. Although the main body of the report contains a recommendation favoring these provisions, actually a *majority* of the council expressed views in opposition to them in the Separate Statements section (the three labor members, the business members, and one public member).

REPORT OF PANEL OF ACTUARIES AND ECONOMISTS

This panel consisted of two economists and two actuaries (Murray W. Latimer, F.C.A.S., F.C.A., and Wendell Milliman, F.S.A., F.C.A.), its secretary being an economist. Its recommendations as to financing and actuarial methodology were the same as those which the council finally made, except that it believed that a 25-year period should be retained for the HI cost estimates (as does this reviewer).

The panel suggested that the SMI trust fund should have a balance equal to the amount of incurred but unpaid liabilities, plus 5–10 per cent of annual benefit outgo (to meet unforeseen contingencies). At present this would mean a fund balance of about \$900 million to \$1 billion, as against the actual balance of \$188 million at the end of 1970. Where would the money come from to increase the fund to this level? Any substantial increase in the premium rate would be inequitable to current enrollees. This reviewer believes that the best that can be done is to have a fund balance of about 20–25 per cent of the annual outgo, or about half what the panel recommended.

CONCLUSION

This reviewer urges that there be a wide readership of the Advisory Council report among actuaries. First, actuaries should be aware of the pressures that exist toward expanding the scope of the social security program; these pressures, if continued and successful, will sooner or later mean a decrease in the role of the private sector in the economic security field. It certainly will be refreshing if some future Advisory Council reports that the program is just fine, has kept up to date with economic changes, and needs no modification or expansion. Second, the views of many more actuaries on the proper financing principles and cost-estimating techniques for the social security program would be helpful to those actuaries who are most directly concerned with it. Third, the thoughtful views of Mr. Siegfried, Mr. Tyson, and Dr. Wilbur opposing overexpansion of the social security program should be read with great care, as should also those of the three labor members and Mr. Young urging its expansion.

ROBERT J. MYERS

*Mark V. Pauly, *Medical Care at Public Expense*, pp. 148, Bibliographical Appendix, Praeger Publishers, New York, 1971. \$13.50.

Medical Care at Public Expense, by Mark V. Pauly, associate professor of economics of Northwestern University, is an outgrowth of the dissertation

which Dr. Pauly wrote for his Ph.D. at the Thomas Jefferson Center for Political Economy at the University of Virginia. The book explores the economic efficiency, both theoretical and practical, of public policy with respect to the public provision of medical care through tax funds. It does not make a similar exploration of the public production of health services as seen in Great Britain and a few other nations. Indeed, the author concentrates on the demand side of the equation and touches only lightly the supply of health care and possible reforms in the delivery system.

Dr. Pauly applies welfare economic theory as his method of study. The efficiency or inefficiency of various arrangements is evaluated with the "Pareto optimality," the process by which an arrangement is determined to be efficient if no change from such arrangement is possible which can further benefit at least one person while making all others at least no worse off. The skeptical actuary will wish to test the Pareto optimality against his own logic. The reviewer wondered whether an alteration in a particular arrangement which benefited ninety-nine persons while making only one worse off might not be more efficient; presumably, it is the uniqueness of welfare economics that builds a floor of protection, as it were, into the test.

The book's first three chapters are devoted to a theoretical analysis of efficiency and optimality in health insurance. Then, in Chapter IV, the theory is employed to determine the characteristics of an efficient national health insurance program. Additionally, two of the 1970 proposals for national health insurance—the Health Security Act (sponsored by Senator Kennedy and others) and the Mediredit Plan (sponsored by the American Medical Association)—are briefly analyzed and tested against the characteristics developed. Chapters V and VI investigate the efficiency of the Medicare and Medicaid programs, and the author's conclusions form the last chapter.

HIGHLIGHTS OF THE THEORY

Dr. Pauly hypothesizes that economic efficiency in medical care exists if (1) the purchase of medical care benefits only the buyer; (2) the price of an additional unit of medical care equals the cost of producing it; (3) the maximum an individual will pay for an additional unit is equal to his "marginal evaluation" thereof; (4) each person purchases medical care and all other goods in such an amount that the maximum amount he is willing to pay for an additional unit equals the cost of the marginal unit.

The author points out that most of the reasons for public, rather than private, provision of medical care flow from failures to meet these conditions. As examples, the author cites imperfect knowledge by consumers which makes marginal evaluation of medical care difficult; failures of the private insurance mechanism to handle all types of risks adequately; a tendency for prices to exceed marginal costs under the present system because of weakened incentives for efficiency in hospitals, most of which are nonprofit;

limited entry to the market for doctors as a result of licensing law and limited space in medical schools; a failure of doctors to delegate tasks to lower-paid paraprofessionals; and, most important to the author, the fact that the purchase of medical care by the buyer often benefits others. This latter phenomenon the author terms the *notion of external benefits, or externalities*.

Dr. Pauly suggests several ways in which optimality might be reached—through laws specifying the amount of care each should consume, through free care (as in the British National Health System), and through price cuts achieved by various types of subsidies. Applying the community demand curve as if medical care were a “normal good,” Dr. Pauly tentatively concludes that optimality requires unequal provision of medical care from individual to individual depending on income. To the extent that price reductions were used, unequal price cuts are required to preclude over- and underconsumption.

In developing an optimal medical care insurance, Dr. Pauly advances the theorem that “individuals prefer insurance with premium m which indemnifies against all losses of uncertain nature to facing without insurance a probability distribution of such losses averaging m .” For the theorem to be valid the costs of medical care must be random, an unlikely situation because the effect of insurance is to reduce the point-of-service price of medical service to zero, or nearly so. This suggests that, if individuals are forced to purchase complete insurance, an inefficiency will be introduced in the form of overconsumption. Based on the foregoing, some of the characteristics of an optimal health insurance are as follows:

1. Copayments would be set at levels calculated so that individuals will buy optimal amounts of care.
2. The coinsurance percentage (percentage paid by the insured) will vary directly with income and, perhaps, inversely with severity of illness.
3. When the optimal amount of care used is equal to that which would be demanded at zero price, all user contributions (copayments or coinsurance) can be in the form of insurance premiums.
4. Generally, insurance premiums would be set at affordable levels—that is, they would be scaled up with income. The community would make up the difference between premiums collected and the actuarial cost.
5. For those who consume so much medical care that additional consumption provides no benefits to others, no subsidy would be provided. That is, there are no externalities. Such people would generally be in the high-income classes.

Dr. Pauly makes the interesting observation that, where the optimal amount of medical care of a particular kind *exceeds* the amount purchased at zero price due to other “costs” (time lost, travel difficulties, etc.), a negative price for such care may be a cheaper solution than forcing an alteration in the health care delivery system to remedy the problem.

COMPARISON OF BASIC PLANS

In the author's analysis of the AMA and Kennedy national health insurance proposals, two comments are worthy of mention. First, the Kennedy plan is based on the notion of a right to care, to the fulfillment of unmet needs, and, accordingly, it takes on the aspects of the externalities argument. (By contrast, the AMA plan is based more on a notion of proper income distribution in which high medical expenses are an unwarranted deduction from income.) Second, under Kennedy's program, there would be overuse of services if demands, as predicted by the theory, were satisfied, or queues (with their time and inconvenience cost) if they were not satisfied.

Dr. Pauly's own recommendations for national health insurance, called variable subsidy insurance (VSI), would begin with full coverage of almost all conceivable expenses for the lowest-income groups. In some instances, to encourage consumption, the per-unit payments might even exceed the cost of care. The premium would be equal to, or very close to, zero. As incomes rose, deductibles and coinsurance would increase, until one reached the other end of the income scale, where only catastrophic coverage would be provided. Dr. Pauly suggests the use of commercial insurers who would be paid subsidies for the difference between affordable premiums and actuarial premiums. By this means, the stigma associated with programs for the poor would be eliminated, since vendors of medical services would not need to know whether the premium were paid in full or not.

In many ways the author's VSI proposal is similar to the Bursleson-McIntyre national health insurance proposal, which is supported by the Health Insurance Association of America.

MEDICARE AND MEDICAID PROGRAMS

Analyzing Medicare and Medicaid, Dr. Pauly suggests

1. That Medicaid be federalized.
2. That catastrophe coverage through Medicaid for virtually all income classes be provided.
3. That those on Medicaid be allowed to buy private insurance with the funds otherwise required, such insurance to have user charges and some premiums.
4. That lower-middle-income families be given some subsidy for the purchase of private insurance.
5. That Medicare benefits be increased for the poor and reduced for higher-income classes.

The book is not an easy one to read, and the reviewer has real concern about the practical application of Dr. Pauly's theories. Nevertheless, Dr. Pauly is to be commended for having had the courage to tackle a very complex piece of research and for laying a theoretical foundation for measuring the efficiency of the public provision of medical care through tax funds.

DANIEL W. PETTINGILL

Eleventh Actuarial Valuation of the Assets and Liabilities under the Railroad Retirement Acts as of December 31, 1968, with Technical Supplement, pp. xiii, 110, U.S. Railroad Retirement Board, 1970.

In compliance with the Railroad Retirement Act requirement that the Railroad Retirement Board make an actuarial valuation at intervals of not longer than three years of the assets and liabilities created by the act, this valuation was prepared by Abraham M. Niessen (who has since retired as the board's chief actuary and director of research) and James L. Cowen (Mr. Niessen's then assistant and now successor).

Mr. Niessen's "Report of the Actuary of the Railroad Retirement Board," which is the valuation and its supporting assumptions and tables, is preceded by a "Statement of the Railroad Retirement Board" and a "Statement of the Actuarial Advisory Committee." The Actuarial Advisory Committee was appointed (pursuant to the Railroad Retirement Act) to "examine the actuarial reports and estimates made by the Board and have authority to recommend to the Board such changes in actuarial methods and assumptions as it may deem necessary." On pages x-xiii the committee reviewed the assumptions of the valuation (such as the \$4.5 billion payroll, the 4.75 per cent interest, and the 19.98 per cent tax rate required to support the system) and concluded that, "in the opinion of this Committee, the results are reliable." The board's statement (pp. viii and ix) then concurred on the valuation's assumptions and conclusions and thanked "the members of the Actuarial Advisory Committee for their part in the preparation of this valuation."

While this valuation was calculated as of December 31, 1968, it pertains to the provisions of the railroad retirement plan as they stood at the end of May, 1970. Thus the effects of the social security amendments of 1969 are included.

The regular railroad retirement plan was determined to be underfinanced to the extent of 0.69 per cent of taxable payroll; thus, in order to achieve actuarial soundness, the tax rate would have had to be increased by 0.35 per cent for both employers and employees beginning in 1969. Projecting the valuation to December 31, 1970, indicated that the actuarial deficiency then became 0.76 per cent. Noting this, the Railroad Retirement Board stated, "The actuarial deficiency of .76 per cent is not sufficiently large so as to be of immediate concern. However, any increase in benefits which is not adequately financed could put the program in jeopardy."

In only two relatively small areas, Medicare causes direct costs to the railroad retirement system. First, hospital insurance taxes must be paid on the first \$7,800 of annual earnings in railroad employment, while the board collects them only on the first \$650 of monthly earnings. Second, the railroad retirement fund absorbs the small cost of hospital services rendered to qualified railroad retirement beneficiaries in Canada. The sum of these two items comes to a small fraction of 1 per cent of the total costs of the system.

Since the completion of the preceding valuation, the railroad retirement program had been materially changed by four pieces of legislation, which are

described in detail in the "Report of the Actuary." These four laws were (1) the social security amendments of 1967, (2) the railroad retirement amendments of 1968, (3) the social security amendments of 1969, and (4) the supplemental annuity amendments which made this particular program permanent and to be financed on a noncontributory, pay-as-you-go basis. The "Report of the Actuary" then summarizes the current provisions of the railroad retirement program, including coverage, co-ordination with social security, types of benefits, eligibility requirements, benefit formulas, financing, and investment policy.

Noting that the period between the preceding and present valuations was characterized by a significant increase in the beneficiary population and by a further decline in the active membership, the actuary remarks that "this combination of events must be regarded as unfavorable to the system." It was noted, however, that the substantial rise in interest earnings on investments and the increase in the amount of earnings subject to retirement taxes "worked in the other direction."

The financial interchange with the OASDI system is explained as follows: "the railroad retirement account is credited with the additional benefits (and administrative expenses) the OASDI system would have had to pay on the basis of railroad earnings. In turn, the OASDI trust funds are credited with the payroll taxes which would have accrued to them with respect to railroad earnings." It is then observed that "the experience under that arrangement has been quite favorable to the railroad retirement system."

The many assumptions of the valuation are described in detail in the "Report of the Actuary." These are followed by descriptions of the level-cost assumptions. Finally, the supplementary annuity program is described and certain supplementary data are presented (e.g., funds on hand and reimbursements to the unemployment insurance account).

Following the "Report of the Actuary" is a Technical Supplement. First, there is a useful glossary of terms, followed by a summary of the general methodology of the valuation and a summary of the assumptions used. Then, tables are presented including the following:

1. 1965 RRB Annuitants Mortality Table
2. 1965 RRB Disabled Annuitants Mortality Table
3. 1965 RRB Totally Disabled Annuitants Mortality Table
4. 1962 RRB Mortality Table for Women
5. 1959 RRB Spouses Total Termination Table
6. Total Termination Table for Disabled Children
7. Active service mortality of railroad workers
8. 1962 RRB Remarriage Table
9. Rates of immediate nondisability retirement used in tenth and eleventh valuations
10. Rates of immediate disability retirement and of eligibility for "disability freeze"
11. Withdrawal rates used in the eleventh valuation

12. Schedules of service months and future salary scales used in the eleventh valuation
13. Family characteristics of railroad men assumed for the valuation of survivor benefits
14. Assumptions regarding eligibility for separate benefits under the Social Security Act
15. Adjustment factors used in the eleventh valuation
16. Mortality experience of railroad normal age annuitants between anniversaries of retirement in 1964 and 1967
17. Mortality ratios for normal age retirements on a select and ultimate basis between anniversaries of retirement in 1964 and 1967
18. Mortality experience of railroad prenormal age annuitants between anniversaries of retirement in 1964 and 1967
19. Mortality experience of railroad disability annuitants between the anniversaries of retirement in 1964 and 1967, select and ultimate
20. Age-specific death rates for railroad disability annuitants for period between anniversaries of retirement in 1964 and 1967
21. Percentages of RRB disability annuitants included in the eleventh valuation mortality studies who would have qualified for a benefit under the social security disability standards
22. Active service mortality of railroad employees
23. RRB mortality experience of widow annuitants during calendar years 1965-68
24. RRB remarriage experience of widows, 1961-68
25. Development of retirement rates for the eleventh valuation
26. Retirement experience of railroad employees, 1965-68
27. Rates of disability retirements and percentages qualifying for a disability freeze
28. Withdrawal experience of railroad employees, 1964-67
29. Various employee censuses.

Many RRB tables are widely used for actuarial valuations unrelated to railroad retirement benefits. They are all conveniently and completely presented in this Technical Supplement.

The railroad retirement system covers over 800,000 active employees, over 6 million inactive employees, and almost a million beneficiaries. The *Eleventh Actuarial Valuation* gives a profile of these people, their families, earnings, and benefits. It could also serve as a textbook in the methodology of employee benefit valuations. A place should be made for it on every actuarial bookshelf.

JEROME M. STEIN

*Sully Ledermann, *Nouvelles tables—types de mortalité*, pp. xxi, 260, Presses Universitaires de France, Paris, 1969, 21 francs.

This book will serve very well for at least two groups of readers: (1) experts in demography and (2) those seeking stimulating examples of noninsurance uses of actuarial science. This review will be more for the benefit of the second group. In discussing the mortality patterns of new nations, it fre-

quently is impossible to construct the usual life table because some data are missing. Mr. Sully Ledermann has constructed new model life tables by which one can deduce a life table for a group of people from certain units of information, such as expected life from birth, or ${}_5q_0$, or ${}_1q_0$, or ${}_{15}q_0$, and so on.

These model life tables possess several advantages over the earlier model tables developed by the United Nations and others. The United Nations tables developed the term ${}_5q_{a+5}$ through a polynomial of the second degree in the previous quotient ${}_5q_a$, for the various a 's. This chain of estimation leads to a bias which is not negligible. Some of the new model life tables allow a double entry—for example, ${}_5q_0$ and ${}_{20}q_{45}$ or ${}_{15}q_0$ and ${}_{20}q_{30}$. Furthermore, the new tables have the values given with allied confidence intervals.

The author made use of 154 base tables of mortality of forty-five countries, from every continent. The variables estimated are the quotients of mortality of ages 0-85, 0-1, 1-4, 5-9, 10-14, . . . , 80-84, in three categories: males, females, and combined males and females, for a total of 54 variables estimated. These 54 variables were estimated with the one or two entries cited earlier.

Although this book is in French, the ratio of amounts of formula and tabular material to textual material is about one to one, so that readers with some knowledge of French should find it relatively easy to read.

This work is one of a collection published in Paris by the National Institute of Demographic Studies. There is an excellent introduction to the book by Hervé Le Bras.

JOHN A. BEEKMAN

Howard W. Fullerton, "A Table of Expected Working Life for Men, 1968," *Monthly Labor Review*, June, 1971.

This working life expectancy table (hereafter referred to as the BLS [Bureau of Labor Statistics] table) combines the life table functions from the 1968 U.S. Life Table for Males with the labor force participation rates prevailing during the three-year period 1967-69. The procedure used in computing the remaining number of years in the labor force is essentially the same as that used in computing life expectancies from a standard-type life table, except that the L_x 's of the life table are replaced by $(L_x w_x)$'s, where w_x is the percentage of men aged x who are in the labor force. The BLS table also shows four rates, all of which are closely associated with the $(L_x w_x)$ functions. These rates are the following:

1. Rate of accession to the labor force:

$$A_x = [(L_{x+1} w_{x+1}) - (1 - m_x)(L_x w_x)] / L_x . \quad (1)$$

2. Total rate of separation from labor force:

$$S_x = (l_x w_x - l_{x+1} w_{x+1}) / (L_x w_x) . \quad (2)$$

3. Rate of death separation:

$$S_x^d = q_x (l_x w_x) / (L_x w_x) . \quad (3)$$

4. Rate of retirement separation:

$$S_x^r = S_x - S_x^d. \quad (4)$$

The accession rates stop at age 32, and the retirement rates begin directly thereafter, with age 33. Finally, the table shows ℓ_x and $\dot{e}w_x$ figures, the latter being the "average number of remaining years of labor force participation." Elsewhere (in Table 1 of the article), the author shows also "expectations of retirement" computed simply as $\ell_x - \dot{e}w_x$.

The primary purpose of this review is to comment on the suitability of the BLS table for purposes of estimating the value of lost earnings in cases of accidental death or permanent injury. (The use of tables of this kind has been suggested for court cases.) Before we examine this specific problem, however, it might be worthwhile to make the following observations:

1. By definition, retired people are considered as "being in the labor force" as long as they do some work or are looking for work. Thus we would find retired persons in both groups of the table's population, that is, among those in the labor force as well as among those not in the labor force. This, in turn, makes impossible the separation of the retired from the nonretired, a breakdown of paramount importance in view of the generally lower earnings after retirement from one's regular job.

2. A rate of accession to the labor force by age could be a very useful piece of information (especially in dealing with an individual not in the labor force at the time of his accidental death or injury), but such a rate would have to tell us what proportion of persons aged x not in the labor force join that force before attaining age $x + 1$. In other words, the denominator in formula (1) should be $L_x(1 - w_x)$ rather than $L_x w_x$.

3. The "expectation of retirement" figures shown in Table 1 of the BLS article do not seem to agree with the customary flow of such figures by attained age. The article shows practically the same figures for ages 35, 45, and 55—namely, 7.9, 7.9, and 8.0 years, respectively. Since the incidence of retirement before age 55 is rather small, the numerators for the three retirement expectancy figures should be almost equal but the denominators significantly different. According to the 1968 U.S. Life Table for White Males, l_{35} is some 13 per cent larger than l_{55} (93,710 versus 82,587), and this should cause the retirement expectation at 55 to be at least 10 per cent above that for age 35; however, the article shows only a 1 per cent differential. This anomaly is most likely a consequence of the lack of precision in separating the retired from the nonretired, which was commented upon in item 1 above.

To return to the main object of this review, it should be pointed out that in the usual court case involving indemnity for death or injury we are dealing with an individual whose status in the labor market is definitely known. If he was in the labor market, the proper tool for estimating the loss of earnings would be a service table which recognizes only death, permanent disability leading to retirement, and retirement on age and service. (One could argue that voluntary withdrawal from the labor market should also be considered, but even the BLS table does not recognize this type of separation.) The service table would then be combined with appropriate earnings data in order to arrive at an estimate of lost earnings.

To be more specific, the estimate should be based on a service table reflecting the experience of the group of which the deceased or injured individual was a member. The estimate would then consider (a) expected earnings before retirement, (b) expected earnings after retirement computed with due regard for the incidence of work after retirement and for levels of pay to retired people, (c) retirement benefits that would have been payable in accordance with the service table and the existing benefit programs, and (d) the retirement benefits that the injured individual can expect to receive during his remaining lifetime. (Survivor benefits have been omitted, although a good case can be made for their inclusion in the computations.) The lost earnings would then be (a) + (b) + (c) - (d). It is obvious that the BLS table cannot provide a basis for computing the items listed above with any degree of reasonableness.

There are additional observations that may be in order. First, the BLS table would not be very useful in estimating occupational replacement needs. Second, if working life expectancy tables were ever useful in planning or improving programs for the dependent aged, this kind of usefulness no longer exists. The periodic beneficiary surveys conducted by the Social Security Administration provide information which, for purposes of such programs, is much superior to that which the BLS table can offer.

To summarize, it appears to this reviewer that the BLS table is an interesting piece of research of rather limited practical value. There may be court cases, however, where this table could be helpful in convincing a jury that loss of earnings should be based on working life expectancy rather than on ordinary life expectancy. Once the principle is accepted, it should be easier for the opposing parties to agree on the specifics of the estimate. It is hoped that future editions of the BLS working life tables will include additional information which will give them greater practical utility.

ABRAHAM M. NIESSEN

*Henry H. Kessler, *Disability—Determination and Evaluation*, pp. 250, Lea & Febiger, Philadelphia, Pa., 1970, \$9.75.

The author concentrates on disabilities caused by accidents and, to a great extent, on partial disabilities of both temporary and permanent nature. Therefore, the actuary whose interests are in the area of traditional disability benefits provided by life insurance companies will not find much of a specific nature that will be helpful to him.

The book will be of greatest value to the medical adviser and administrator of a workmen's compensation board or a veterans' pension board, as far as the specifics of the text are concerned. In the preface, however, the author states:

The purpose of this book, therefore, is to review the whole concept of disability and discuss its semantic, economic, and physiological meanings. To meet the demand of modern legislation for the establishment of benefits and pensions for the disabled, a much firmer foundation is required than the irrational methods of defi-

dition established by controversy. It is hoped that the idea of disability will be given a rational interpretation from which methods can be developed for its determination and assessment.

This purpose is well achieved; much of the text demonstrates that many rules for awards are arbitrary and even rules that are sound on the average may be very far off when applied to a particular individual.

The author begins the book with a philosophical definition and discussion of disability which relates the actual physical defect to the human person, to his occupation, to society, and to the individual's emotional reaction to the entire situation. This type of perspective does give the reader an opportunity to think out the benefit design, contractual provisions, and underwriting and claim administration procedures of the particular type of disability with which he is involved. The resulting insights might prove helpful in improving the design or delivery of the benefits or the approach to rehabilitation.

The text follows this initial discussion of disability with a description of the tests and criteria which quantify the impairment—for example, ways to measure restriction of activities and loss of earning capacity. So much of what most actuaries deal with involves loss of actual earnings rather than loss of potential earning power, and the former only when it qualifies under the terms of the pension plan or insurance contract, that they may not find this section of the text relevant to their specific professional duties.

The text continues with several detailed chapters on medical evaluation of impairments of the upper and lower extremities, spine and head injuries, and so on. In 118 pages of text on impairment, only a single page is devoted to cardiovascular problems, since the emphasis is almost entirely on impairments caused by accidental injuries.

The author discusses workmen's compensation, social security, and veterans' pensions with reference to international comparisons, history and rationale of benefits, procedures, and awards.

The author concludes the book with his hope that rehabilitation can be the goal for the future, to be obtained by the enlightened co-operation of medical advisers, occupational specialists, labor, and management under the guidelines set down by legislative and policy-making bodies.

In summary, the book is of interest to actuaries in their role as intelligent citizens, but it will afford little aid in their professional duties.

ANTHONY J. HOUGHTON

*Jerome B. Gordon, Allan Akman, and Michael L. Brooks, *Industrial Safety Statistics: A Re-examination*, pp. xxxix, 300, Praeger Publishers, New York, 1971, \$17.50.

The Bureau of Labor Statistics employed a research organization to make a critical evaluation of BLS procedures and reports relating to safety statis-

tics, to test alternative techniques, and to recommend improvements. The published results of the examination indicate that present BLS reports are incomplete and inadequate for the purpose they are intended to serve. The problems and shortcomings associated with the use of data-collecting facilities of the individual states and the handicaps which result from limited funding are described at length.

Recommendations are for greater uniformity in procedures, performance standards, and editing, as well as a continuing program of quality control. Greater provision for guidance and training should be provided by professionals at the national level. There is a need for more complete reporting of primary data, which could be promoted by making employees alert to hazards and job injuries through safety training and providing them with increased feedback of the information contained in BLS reports. Suggested alternative methods include the use of reports generated by workmen's compensation benefits.

Statistics and reports prepared by industry sources and the National Safety Council are considered to be biased and unsuitable as objective measures of national and local work injury problems.

D. J. VAN KEUREN

U.S. Arms Control and Disarmament Agency, *Pensions and Severance Pay for Displaced Defense Workers* (a report prepared by Hugh Folk and Paul Hartman, Institute of Labor and Industrial Relations, University of Illinois), U.S. Government Printing Office, Washington, 1969.

This is the latest in a series of research studies devoted to exploring the implications of reductions in defense demands on the domestic economy. The authors of the study drew on three previous studies of displaced workers, one covering the effects of the Dyna-Soar contract cancellation on Boeing employees in Seattle, the second on re-employment experiences of Martin Company workers released in Denver in 1963, and the third on the labor market experiences of former Republic Aviation, Long Island, workers. In addition, the authors drew on the public files maintained under the Welfare and Pension Plans Disclosure Act.

The findings of the study were that employment in defense industries is more unstable than employment in nondefense industries and that the higher termination rates result from individual company mass terminations rather than from a high average across-the-board rate of termination. Few workers in defense industries are eligible for vested benefits or early retirement at cutback, by reason of their short service. Defense workers have been more successful in re-employment than nondefense workers, in part because of their lower average age. Few displaced defense workers have withdrawn from the labor force. The vesting provisions in the pension plans of defense contractors are generally more liberal than those in nondefense firms.

The study explores the possibility that large-scale cutbacks in defense employment can leave pension plans with significant actuarial gains which might benefit the sponsoring company either by lowering their ongoing pension expense or by actually reverting to the firm. The study concludes that it would be possible and desirable under the IRS regulations and the Armed Services Procurement regulations to require better vesting provisions for displaced defense workers. This conclusion at the end of the study is somewhat unexpected, since the study earlier stated that private pension plans are likely to be of little help in offsetting the loss suffered by displaced workers. In fact, midway through the study the authors conclude that a special form of supplementary unemployment benefit program in the defense industries would appear to provide the most direct means of meeting the loss resulting from cutbacks in levels of defense-related employment. In any case, the authors apparently are so convinced that pensions are merely deferred compensation that they leap to the conclusion that defense firms should be required to provide full immediate vesting, so that the government expenditures for defense products will actually end up in the pockets of the specific workers working on the defense projects. The study notes that, relative to younger workers, displaced older workers tend to be unemployed for longer periods and are likely to experience greater reduction in pay even if they are re-employed. Also, older workers tend to make fewer of the adaptations which contribute to finding another job, since they are less mobile than younger workers geographically, industrially, and occupationally. The specific problems relating to engineers are explored in some depth. The study concludes that age is the single characteristic most closely related to difficulty of re-employment.

The study contains information regarding benefit provisions, actuarial assumptions, and funding status for the pension funds of both defense and nondefense firms, as derived from the disclosure filings. In general, the statistics assembled suffer from the inaccuracies, misinterpretations, and incomplete filings associated with disclosure material.

On the subject of early retirement, the authors believe that "[a] reasonable basis for benefit reduction would include only the effect of a lower period over which payments will have to be made appropriately reflecting mortality." They proceed to contend that the actuarial reduction is most unfair because it reflects both the lower payout period and the curtailed funding period. The authors then include a table showing what the early retirement benefit would be, based on the ratio of purchase prices of immediate annuities at ages 55 and 65 drawn from seven major insurance companies. Actuaries will recognize, of course, that this does not present an actuarial equivalent, since the individual aged 55 who has earned a pension that would normally start at age 65 is not in the position of comparing two immediate annuities as the authors seem to imply; for him the age 65 annuity obviously is deferred for ten years, and both interest and mortality

over that period serve to make the direct actuarial reduction lower than a reduction obtained by a simple comparison of immediate annuity values. The study also considers the questions whether early retirement is in the national interest and whether tax-subsidized programs, such as pension plans, should, in fact, encourage early retirement.

This study will be of interest to any actuary working on pension plans in defense industries, and to pension actuaries generally, in connection with the particular problems arising at plan termination or mass layoff.

PAUL H. JACKSON

Clyde V. Kiser, Wilson H. Grabill, and Arthur A. Campbell, *Trends and Variations in Fertility in the United States*, pp. xxx, 338, Harvard University Press, Cambridge, Mass., 1968, \$6.95.

One of a series of "Vital and Health Statistics Monographs" sponsored by the American Public Health Association,¹ this book analyzes fertility trends and differentials in the United States based on the 1960 U.S. Census, prior censuses, and such other material as the Growth of American Families Study,² various Current Population Surveys, and the 1960 U.S. Census report *Women by Number of Children Ever Born*.

Containing a staggering amount of statistical data, the book in its textual total may be slightly less than the sum of its parts. Current fertility rates and trends are analyzed with respect to color and ethnic group, residence, migration, marital characteristics, illegitimacy, education, occupation, income, and other social and economic factors.

The authors attempt to explain many of the statistical results that emerge from these data. For example, they logically conclude that Alaska's very high crude birth rate and total fertility rate are the result partly of its relatively large number of young white couples (as compared to a smaller number of older couples) and, particularly, frequently rotated military service families, and partly of the fact that Alaska's Eskimos and Indians are among our most fertile ethnic groups. However, many other characteristics are so interrelated that they seem to be used to explain one another without any satisfactory clue as to cause or effect. An example is the interrelationship among fertility by color, farm versus nonfarm areas, and state of residence.

Such redundancy in the text does not detract from the value of the data that have been accumulated from the various sources and presented herein. The documentation appears to be scrupulous, and the several studies seem to affirm one another's reasonableness. Chapter 13, which discusses cohort fertility measures (after distinguishing them from period fertility measures),

¹ See Franklin E. Peters' review of Albert P. Ilsant and Paul V. Joliet, *Accidents and Homicide*, in *TSA*, XXII, 54.

² Whelpton, Campbell, and Patterson, *Fertility and Family Planning in the U.S.* (Princeton: Princeton University Press, 1966).

should be especially useful and interesting for the student of demography. Cohort analysis, particularly from successive census data, is, of course, a valuable approach to many other demographic subjects. The student can also learn in depth about several important fertility measures discussed only briefly in more general demographic texts, such as "children ever born per 1,000 ever-married women" and "fecundity," including the definitions of the various types of subfecundity.³

The greatest usefulness of this book should be as a source of significant fertility data based on almost every major parameter and characteristic of life and family in the United States.

JEROME M. STEIN

*Francis P. King, *Benefit Plans in Junior Colleges*, pp. 636, American Association of Junior Colleges, One Dupont Circle, N.W., Washington, D.C., 20036, 1971, \$6.00.

Every ten years or so the Teachers Insurance and Annuity Association (TIAA) has published a book-length study of employee benefit practices among colleges, entitled *Benefit Plans in American Colleges*, most recently in 1969. Now Francis King, TIAA's research officer, has for the first time completed the same kind of study for junior colleges. The junior college study was sponsored by the American Association of Junior Colleges and Esso Education Foundation, and was based on a 12-page questionnaire completed early in 1970 by 893 of the 1,007 junior colleges surveyed regarding their benefit plans.

The text, occupying the first half of the book, discusses (1) the design of the study and a summary of the findings; (2) retirement systems in general, and the five specific systems serving the junior college market (in decreasing order of importance these are public retirement systems, TIAA-CREF, insurance company plans, self-administered/trusteed plans, and church pension systems); (3) specific retirement plan provisions; (4) the federal social security system in the United States; and (5) group life, health, short-term disability, and long-term disability insurance. The text is clear and informative enough to provide a solid understanding of employee benefit design for the general reader, although it is distinctly slanted in favor of generous benefits and TIAA's standard products. Only the chapter on long-term disability was disappointing. There was no discussion of the difficulties of determining the existence and continuation of disability, or the need for close co-operation between the employer and insurance company in borderline cases; the text makes it appear that the contract definition of disability solves all problems. There is only a passing reference to the dangers of excessive long-term disability benefit levels, in that the author

³ See also Mortimer Spiegelman, *Introduction to Demography* (rev. ed.; Cambridge, Mass.: Harvard University Press, 1968), chap. 9.

recommends an offset of benefits from other sources. In the long-term disability plans surveyed the social security offset applies to primary benefits and usually to dependents' benefits as well, but there is no mention of the resulting need for special provisions to prevent inequities against lower-paid employees under contributory plans (e.g., excluding the lower-paid from eligibility, reducing their contribution rates, or providing a minimum benefit).

The last half of the book is devoted to tables containing the following material:

1. A listing of the responding junior colleges, showing for each the categories of benefit plans (pensions, group life, basic medical, major medical, short-term disability, and long-term disability) covering their faculty, administrative, and clerical service personnel.
2. The frequency distribution of the different versions of sixty-six important benefit provisions in the plans surveyed.
3. A brief description of each institution's pension plan. These include seventy-seven public retirement systems, most of which cover public employees or teachers in a single state or city.

In building upon the formula set by the earlier volumes, the author has expanded the text, cleaned up the layout and type style, and cross-referenced the tables to the text. An artistic success it definitely is, but how well does this study justify its opening words: "This book fills a great need"? What sort of need is being filled here, other than TIAA's need to promote its name and products among the junior colleges? First, and of most direct interest to a member of the Society, the book is an indispensable reference work to the consultant or marketing executive working with junior colleges in designing and installing benefit plans. He can anticipate that the typical junior college administrator is familiar with the book, and thus he can short-cut much of the basic educational work so often necessary in the plan-designing process. Also, he can draw on a rich bank of statistics in discussing the usual question, "What are my competitors doing?"

The book is noteworthy as an example of how to approach a specialized market, with TIAA somehow having obtained outside sponsorship, technical assistance, and funds for the study. Here is an example that the private pension industry might well try to follow in other markets to help fill the coverage gaps which now exist.

Perhaps the most important long-range need served by this series relates to the colleges' role as educators of future generations, molders of public opinion, and increasingly influential forces in the legislative field. One need only consider the recent success of Professors Keeton and O'Connell in advancing their ideas regarding no-fault auto insurance, of Belth regarding life insurance net-cost comparisons, and of Bernstein and Schulz regarding pension regulation, to project into the future the possible impact of new efforts by academics to change public opinion regarding employee benefits. Here is a

sampling of the opinions the book provides to any potential employee benefits activists on our campuses:

1. Those actuaries who have a personal stake in the field of defined benefit retirement plans and who favor moderate vesting will not find much to cheer about here:

A retirement plan should be constructed so as to assure the individual that for each year of employment there will be, without condition, an increment of retirement income to begin at some future date. . . . A funded retirement plan is simply a savings process followed by a lifetime pay-out period.

A typical TIAA-CREF retirement plan is designed around the money-purchase concept, with immediate eligibility, immediate vesting, and a variable annuity option. The author quotes recent government studies favoring pension portability and points out the lack of portability across state lines in public retirement systems (which usually provide defined benefits). Even the discussion of variable annuities favors defined contribution plans, so as to weight the early years and long-term stock market trends more heavily. This argument ignores a classic disadvantage of defined contribution plans—namely, that they already weight the early years too heavily; if the variable annuity feature is doing its job, it only makes worse the misallocation of employer and investment dollars.

2. Distinguished contributor Robert Myers leaves no doubt as to the basic nature of the social security system:

Social Security is essentially a national system for collecting a part of each wage earner's income as taxes and redistributing it as benefits to widows and dependent children and to former wage earners who have become disabled or have reached retirement age and have retired.

As an income transfer system, the collections from today's working participants are used to pay today's beneficiaries. Essentially, one generation pays benefits to another, with only a relatively small reserve fund in between. Thus, the system is not one in which each contributor's input is reserved and invested for the future use of the contributor himself. Instead, the working participant establishes an entitlement to Social Security benefits for himself and/or for his family, payable in the future at future benefit levels from funds "contributed" by the then working generation. As long as the worker remains "covered" for Social Security benefits and the program itself remains a part of our society, his turn (or his survivor's) will come to take a place on the receiving side of the income transfer system.

As a national program with broad social purposes, Social Security cannot be directly compared with individual or institutional retirement and insurance plans. Social Security is primarily a system of "social equity," quite distinct in its financing and treatment of people from the individual equity of insurance and annuities in the private sector, where a given amount of premium normally purchases a specified right to a certain amount of retirement, death, disability, or health benefit. To some degree, Social Security benefits are related to the earnings on which taxes were paid on behalf of an individual, but the emphasis is on income redistribution and on the individual's presumed needs, appropriate criteria for a national program.

3. The author takes a sensible view toward "first-dollar" health insurance coverage:

Allocations from regular family income and savings may be reasonably expected to meet needs for routine items of medical care. But when medical expenses begin to accumulate, most people need financial help.

This same kind of thinking, of course, did not seem to carry over to retirement plans, where the text takes extreme positions in favor of immediate eligibility and vesting.

Whether or not one agrees with everything in these volumes, they are a fact of life in the college market, and they will continue to increase the colleges' appreciation of benefit concepts and their disposition toward more generous benefits for their employees.

RICHARD G. SCHREITMUELLER

*Vladimir P. Chernik, *The Consumer's Guide to Insurance Buying*, pp. 288, Sherbourne Press, Inc., Los Angeles, Calif., 1970, \$6.50.

The jacket of this book says that it will show the reader "how to get the most effective and reliable insurance for the least amount of money, in all major areas of coverage." In addition, Mr. Chernik attempts to advise on how to select an insurance agent and how to determine which is the best insurance company. The best measure of the book seems to be how well these objectives are achieved.

Mr. Chernik's advice in selecting an agent seems to be to avoid all life insurance agents, since they are poorly trained in knowledge of their products but very well trained as salesmen and since life insurance agents put their own interests above those of their customers. Obviously, there are many life agents who have these characteristics—just as there are many who do not. On the other hand, Mr. Chernik writes much more favorably about the "independent" casualty agents, who, he says, assume greater responsibility and operate more efficiently and honestly. Does Mr. Chernik give the consumer any sound advice in finding a competent agent? I do not think so. To be on guard against all agents may be wise advice, but the guilt-by-association technique used by Mr. Chernik leaves much to be desired.

With respect to choosing the best insurance company, Mr. Chernik gives sound advice about checking financial rating guides such as *Best's Insurance Guide* and about avoiding companies not licensed in the consumer's state of residence. He goes further in the case of life and health companies and suggests eliminating all non-New York companies. It is possible that those people associated with New York-admitted companies might applaud this advice, but blanket statements such as Mr. Chernik's are rarely correct. Mr. Chernik very cleverly stimulates antagonism on the part of the consumer toward the big, wealthy insurance companies without really ever mentioning any practice that is improper. Insurance companies are big and control much

money; therefore, they are bad! Ridiculous when stated that way, but that is all that Mr. Chernik really says.

One of Mr. Chernik's central premises is that the consumer should buy insurance to obtain protection and for no other reason. In each discussion of the various forms of insurance coverage that the typical consumer might buy, the author comes back to this principle.

In discussing life insurance, Mr. Chernik points out that individuals' needs are different and that the insurance purchased must reflect these needs and must balance current enjoyment against future security. He then goes on to conclude that the consumer is always best served by buying term insurance. While Mr. Chernik mentions that the need to maximize the amount of life insurance coverage may well require the purchase of term insurance if the cost is to be kept within reason, this is not his main argument in favor of the exclusive purchase of term insurance. I detected no consistent logical development showing why the consumer should buy term insurance. Mr. Chernik seems to use the technique of repeating his conclusion in increasingly positive statements, relying on the fact that the casual reader will accept it and think that a brilliant, logical argument led to the conclusion. His other technique is to disparage the alternative of permanent insurance. He does this by ridiculing the philosophy and operation of cash value insurance. He says that cash value insurance is preposterous—in his book, it is, because of the way he describes it.

Mr. Chernik touches on minimum deposit life insurance and suggests that the agent is in favor of it because it means increased commissions and the company is in favor of it because it collects interest on the policy loan. I doubt whether many companies really sell minimum deposit insurance in order to get 5 or 6 per cent on a policy loan. This is an example of Mr. Chernik's lack of knowledge and expertise in the life insurance field. He should, but does not, point out that minimum deposit insurance is really a form of term insurance and that for some consumers it may be the cheapest term insurance available.

When Mr. Chernik discusses health and casualty insurance, he seems to be on firmer ground. He supplies more facts about the murky areas of what is usually covered and what is not covered, and he writes with more authority. This may be because he has had experience as a claims adjuster. In the selection of health insurance coverage, he advises insuring against the catastrophic happening rather than the budgetable minor illness. However, he then turns around and suggests Blue Cross-Blue Shield coverage, which normally has a first-dollar orientation. In the case of auto, fire, homeowners, and other casualty insurance coverages, he touches a responsive area in the reader when he catalogues the problems the "average" consumer faces in obtaining satisfactory coverage and lists various steps to consider.

Does Mr. Chernik accomplish what the book's jacket says he will? I think not. The consumer who reads *The Consumer's Guide to Insurance Buying*

will find that a former insurance company employee (who naturally will seem to be knowledgeable) holds the industry, its people, and its practices in low regard. Those readers who are associated with the insurance industry may want to read it to see how the industry is pictured.

JOHN R. MCCLELLAND

*Sylvia and Leslie Tutt, *Private Pension Scheme Finance*, pp. 311, Stone & Cox (Publications), Ltd., 44 Fleet Street, E.C. 4, London, England, \$5.75.

Mr. Tutt is a Fellow of the Faculty of Actuaries, an Associate of the Society of Actuaries, and a Fellow of the Institute of Statisticians. Sylvia Tutt is an Associate of the Chartered Institute of Secretaries. Their text sets forth various financial aspects of pension practice in the United Kingdom. The treatment is rather elementary, and the book appears to have been written from the point of view of an insurance company actuary, but it does provide a sort of hodgepodge collection of practical aspects of pension finance, including the laws, social insurance schemes, accounting practices, and methods of selecting individual investments. This book will be useful to United States actuaries wishing to get a "feel" for the British scene and a handle on the unfamiliar nomenclature.

Considerable space is devoted to insurance company schemes, with an elementary description of group deferred annuity contracts, other life office schemes such as endowment assurance schemes, participating and nonparticipating schemes, pooled funds, segregated accounts, and multiemployer schemes. In general, the insurance company pension schemes are complex and inflexible, and the insurance company dividends are arbitrary and geared to attract future premiums rather than assiduous in consideration of the equity of various generations. This United Kingdom tradition is justified on the grounds that "[i]t is a competitive world and a halo is not a saleable commodity." The insurance programs set forth in the text appear to be at the stage of development that the United States insurance companies reached in the 1930-40 period. We are apparently quite lucky in the United States to have severe competition prodding us, since the United States pension delivery system appears far advanced by comparison with that described.

The one chapter specifically devoted to self-administered funds spends considerable time comparing the merits of such funds with life office schemes, quotes the remarks of several British and Australian actuaries on equalization of burdens and inflation, and ends with seven pages on asset valuation, consisting of a paraphrasing of the Jackson and Hamilton 1968 *TSA* paper and the presentation made by Haywood and Lander to the Institute of Actuaries in 1961. The paraphrasing of the Jackson and Hamilton article was accurate.

At one point the text raises the question whether an employer should provide a vested pension to a terminating employee based on the salary the

employee will eventually receive from some subsequent employer in the five or ten years preceding his retirement, or whether the second employer should provide for pension on the basis of final salary and total service less the benefits under other programs. While the United Kingdom pension scene differs considerably from that in the United States, this suggestion from an actuary regarding a private pension program seems most unusual. The text also contains politically oriented statements, for example: "It is apparent that anyone who aspires to enter a pensionable employment in Great Britain enhances his chances considerably by choosing to be a man, choosing to be non-manual, and choosing public sector employment." This, no doubt, is the touch of Sylvia Tutt. One wonders why it is not so apparent that anyone, man or woman, who aspires to enter pensionable employment would not first inquire which employers provide a pension and which do not.

By and large, this book will be found disappointing by most United States actuaries, since it provides a very uneven treatment of the various factors affecting the financing of pension funds. There is little treatment of benefit provisions such as disability retirement, early retirement, widows' pensions, and so on. Yet there is lengthy discussion of British Leyland as an investment opportunity, and extensive citing of various laws. The text is filled with rationalizations and old wives' tales, but it was apparently intended as literature for sponsoring employers and accordingly does provide them with a few handy tables.

While the subject matter is important, the treatment, unfortunately, is too often naïve, shallow, and lacking in purpose. The book gives the impression of complete disorganization and in large part appears to consist of all sorts of quotations and topics which the authors have collected over a rather extensive period of practical experience in the pension field. Its value to United States actuaries will lie in rather minimal practical aspects. The text can easily be read in one evening, and it must be assumed that the rather biased and cumbersome treatment set forth is at least representative of that which one actually would run into in practice in the United Kingdom. On balance, this reviewer wishes that the authors had not favored him with extensive quotations in such hit-or-miss treatment of a topic deserving far more rational and thoughtful treatment.

PAUL H. JACKSON

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."

LIFE INSURANCE AND ANNUITIES

Creating a Corporate Plan for a Life Insurance Company, pp. 83, Financial Planning and Control Report No. 17, July, 1970. Reviewed in *The Actuary*, September, 1971.

An Approach to Measuring Profitability of Field Office Operations of a Life Insurance Company, pp. 23, Financial Planning and Control Report No. 19, Life Office Management Association, February, 1971. Reviewed in *The Actuary*, September, 1971.

Douglas G. Olson and Howard E. Winklevoss (eds.), *Proceedings of the National Conference on Variable Life Insurance*, pp. 131, Insurance Department, University of Pennsylvania, \$5.00. Reviewed in *The Actuary*, September, 1971.

HEALTH INSURANCE

Report of the 1970 National Health Forum Meeting the Crisis in Health Care Services in Our Communities, pp. 210, National Health Council, Inc., New York. Reviewed in *The Actuary*, April, 1971.

U.S. National Center for Health Statistics, *Report of the Twentieth Anniversary Conference of the United States National Committee on Vital and Health Statistics*, pp. 42, Vital and Health Statistics Documents and Committee Reports, Series 4, No. 13, Rockville, Md., September, 1970.

This report summarizes discussions that took place at the Twentieth Anniversary Conference of the United States National Committee on Vital and Health Statistics. Present and past members of the committee met with invited guests, including foreign colleagues, to consider three problems of general concern to workers in the areas of demographic and health statistics:

1. What steps should be taken to protect the basic human rights of the individuals from whom the data that yield these statistics are obtained? Emphasized were, on the one hand, the privacy rights of the statistics and, on the other, maintenance of the confidentiality of the information secured. The individual's right to privacy and society's needs for information must be reconciled.

2. What are currently developed needs in (a) health statistics, (b) health services resources and utilization data, (c) demographic statistics, and (d) demographic and health statistics to formulate public policy?

3. How can work in the areas of demographic and health statistics, national and international, be advanced by national committees?

Eight invited papers are presented in abbreviated form, along with summaries of the comments by assigned discussants and the main points made in extensive general discussions.

U.S. National Center for Health Statistics, *Effect of Some Experimental Interviewing Techniques on Reporting in the Health Interview Survey*, pp. 62, Data Evaluation and Methods Research, Series 2, No. 41, Rockville, Md., May, 1971.

The basic study, which is described in Vital and Health Statistics, Series 2, No. 26, indicated that reporting in an interview can be improved more effectively by increasing the behavioral interaction of the respondent and the interviewer during the interview than by changing the basic attitudes of the respondent or increasing his levels of information.

In view of this finding, it seemed that improved reporting might be obtained by the introduction of techniques by the interviewer to encourage respondent reaction during the interview which would stimulate maximum recall. This approach, however, varied substantially from the usual practice of training interviewers to behave in a standardized manner during an interview. The standardized manner, which was restricted to asking questions and recording responses, was an attempt to reduce the known biasing influence on survey data that has been attributed to interviewer performance.

The design of this series of studies has taken advantage of the fact that interviewers can influence respondents, and it has attempted to bring the potentially biasing behavior cues under control—in effect, to incorporate them as a part of the “standardized” behavior. Through the interaction between the interviewer and the respondent it was expected that the systematic changing of the interviewer's technique would change the activity level of the respondent, thereby increasing the amount and quality of reported health information.

Because of the complex relationship among methods of interviewing, the performance of interviewers, and the reporting of respondents, the problem of obtaining accurate data in a household interview is not a simple one. The findings from this investigation of experimental interviewing techniques indicate that verbal “reinforcement” of the respondent (i.e., appreciative comments by the interviewer following fruitful recall efforts by the respondent), question length, direct memory probing, an intensive interview, and a diary procedure can have important effects on survey interview data. More investigation is needed to determine the appropriateness of specific techniques for the collection of certain types of health information and to evaluate their effectiveness in terms of the validity, reliability, and quantity of data reported.

U.S. National Center for Health Statistics, *Current Estimates from the Health Interview Survey—United States—1969*, pp. 57, Data from the Health Interview Survey, Series 10, No. 63, Rockville, Md., June, 1971.

This report is the first of the “Current Estimates” series to present data entirely from interviews using the “person approach.” Prior to July, 1967, data for this series of reports were obtained from interviews using the “condition approach.” During the period July, 1967—June, 1968, a split-sample methodology was used, in which one-half of the sample population was interviewed using the “condition approach” and the other half using the “person approach.”

Provisional estimates are presented of incidence of acute conditions, number of persons reporting limitation of activity, number of persons injured, hospital discharges, persons with hospital episodes, disability days, and frequency of dental and physician visits. They are based on data collected in the Health Interview Survey during calendar year 1969.

U.S. National Center for Health Statistics, *Chronic Conditions and Limitations of Activity and Mobility—United States, July 1965—June 1967*, pp. 72, Data from the National Health Survey, Series 10, No. 61, Rockville, Md., January, 1971.

In this report statistics are presented on the proportion of persons with limitation of activity or mobility and the prevalence of selected chronic diseases and impairments reported as causing the type of limitation. Activity limitation refers not

only to the major activity of the person (ability to work, keep house, or engage in school or preschool activities) but also to recreational, civic, and similar activities. *Limitation of mobility* refers to the ability of the person to move freely. These findings are based on data collected in health interviews conducted during the period July, 1965—June, 1967, and update similar reports.

The number of persons with limitation and the number of conditions causing limitation are distributed by age, sex, color, family income, employment status, and geographic region.

During the period July, 1965—June, 1967, about 22.0 million persons, or 11.5 per cent of the civilian, noninstitutional population of the United States, were limited in their activities. An estimated 6.3 million persons (3.3 per cent of the population) were limited in mobility.

Heart conditions were reported as causing 16.4 per cent of all activity limitation and 12.6 per cent of mobility limitation. Arthritis and rheumatism caused 14.8 per cent of limitation of activity and 24.4 per cent of limitation of mobility. Other leading causes of activity limitation were impairments (except paralysis) of back or spine, mental and nervous conditions, impairments (except paralysis and absence) of lower extremities and hips, visual impairments, and hypertension without heart involvement. Other leading causes of mobility limitation were impairments of lower extremities and hips, paralysis (complete or partial), visual impairments, impairments of back or spine, and mental and nervous conditions.

U.S. National Center for Health Statistics, *Disability Components for an Index of Health*, pp. 35, Data Evaluation and Methods Research, Series 2, No. 42, Rockville, Md., July, 1971.

This is a methodological study of an aggregative measure of several forms of disability, intended for use as one component of a joint mortality-morbidity index.

U.S. National Center for Health Statistics, *Expenses for Hospital and Institutional Care during the Last Year of Life for Adults Who Died in 1964 or 1965—United States*, pp. 67, Data from the National Vital Statistics System, Series 22, No. 11, Rockville, Md., March, 1971.

In this report statistics are presented on expenses for hospital and institutional care during the twelve months before death for adults aged 25 years or older who died during 1964 or 1965.

These statistics are based on the data collected in a mail survey on questionnaires sent in each case to the person who provided the funeral director with the decedent's personal information for recording on the death certificate and to any hospitals or institutions in which the decedent received care during the year before his death.

The decedents about whom information is presented in this report are classified by age, color, sex, marital status, geographic region, living arrangements, family income during the last full calendar year before death, and cause of death. Also included is information on the number of hospital or institutional episodes, the average length of stay, and whether the care was received in a short-stay hospital or in an institution.

About 73 per cent of the adult decedents were reported to have had hospital or institutional care in the year before death. Of those who had care in a medical

facility, about 43 per cent had bills of \$500 or less and 57 per cent had bills of \$500 or more. Approximately 38 per cent had bills amounting to \$1,000 or more.

Of the variables included in this report, the one with the greatest effect on the expenses for hospital and institutional care was cause of death. The median cost for care in a medical facility for persons who died of malignant neoplasms was over \$1,000, while the lowest median cost, \$457, was for persons who died from accidents, homicide, or suicide.

The expenses for care in medical facilities were also higher for decedents who had episodes both in short-stay hospitals and in institutions than for decedents who had only short-stay episodes or institutional episodes.

U.S. National Center for Health Statistics, *Children and Youth, Selected Health Characteristics—United States—1958 and 1968*, pp. 86, Data from the National Health Survey, Series 10, No. 62, Rockville, Md., February, 1971.

This report brings together statistics on a variety of health topics for the population under 25 years of age—the children and youth of the nation. Summary information relating to the amount and kind of illness, injury, and disability experienced by young persons is presented by topic. Information about the utilization of medical services and about health insurance coverage is also presented. The effect on some of these health characteristics of such variables as sex, residence, family income, and color is considered.

U.S. National Center for Health Statistics, *Sample Design and Estimation Procedures for a National Health Examination Survey of Children*, pp. 40, Data Evaluation and Methods Research, Series 2, No. 43, Rockville, Md., August, 1971.

This report presents a detailed description of the sample design and estimation procedures employed by the Health Examination Survey in a nationwide survey of youths 6–11 years of age in the noninstitutional population of the United States. The objective of the survey was to collect data which would provide national estimates and distributions of various health characteristics related to the growth and development of this target population.

U.S. National Center for Health Statistics, *Diabetes Mellitus Mortality in the United States—1950–67*, pp. 41, Data from the National Vital Statistics System, Series 20, No. 10, Rockville, Md., July, 1971.

Trends for 1950–67 and differences for selected periods by age, sex, color, marital status, and geographic area are presented. Also analyzed is diabetes mellitus as it is associated with other causes of death.

U.S. National Center for Health Statistics, *Surgical Operations in Short-Stay Hospitals for Discharged Patients—United States—1965*, pp. 30, Data from the National Health Survey, Series 13, No. 7, Rockville, Md., April, 1971.

Statistics are presented on the volume and classes of surgical operations and procedures performed in short-stay hospitals, based on data abstracted from a national sample of records of inpatients discharged. Estimates of discharges with

surgery, and all listed operations classified by surgical specialty and body site, are distributed by size and regional location of the hospital and by age and sex of the discharged patients.

SOCIAL SECURITY

Max Horlick and Alfred M. Skolnik, *Private Pension Plans in West Germany and France*, pp. 78, Social Security Administration, Research Report No. 36, March, 1971. Available from the Superintendent of Documents, \$0.40.

This report describes the private pension movement in each of the two countries, emphasizing the role apparently assigned to private pensions in the over-all wage-replacement setups. The information is presented in the hope that it will provide a perspective for alternative solutions to problems now under consideration in this country. Among the items discussed in the report are the approaches to vesting, funding, protection against inflation, and extent of government regulation. The discussion is general and not burdened with unnecessary detail.

Edna C. Wentworth and Dena K. Motley, *Resources after Retirement*, pp. 88, U.S. Department of Health, Education, and Welfare, Social Security Administration, Research Report No. 34.

The Social Security Administration has conducted surveys at intervals on the economic situation of people in their retirement years. The surveys covering the years 1941-62 form the basis for *Resources after Retirement*, which analyzes trends in the income, net worth, living arrangements, income levels, and assistance standards of social security beneficiaries.

The report analyzes both the sources of income and the size of income of social security beneficiaries. It analyzes net worth in terms of assets, debts, and dissavings. The analysis of living arrangements includes a study of intrafamily financial transactions.

Margaret A. Lannen, *Comparison of Actual Experience under OASDHI System with Short-Range Cost Estimates*, pp. 6, Actuarial Note No. 74, Social Security Administration, Washington. Reviewed in *The Actuary*, April, 1971.

Advisory Council on Social Security, *Reports of the 1971 Advisory Council on Social Security*, pp. 183, Washington, March 31, 1971. Reviewed in *The Actuary*, June, 1971.

Selected Current Reference Data on the Railroad Retirement and Social Security (OASDHI) Systems, Actuarial Note No. 3-71, issued by the Office of the Chief Actuary, Railroad Retirement Board, May, 1971. Reviewed in *The Actuary*, 1971.

Walter W. Kolodrubetz, "Trends in Employee-Benefit Plans in the Sixties," *Social Security Bulletin*, April, 1971. Reviewed in *The Actuary*, June, 1971.

Virginia Reno, *Preliminary Findings from the Survey of New Beneficiaries*, Office of Research and Statistics, Social Security Administration, March, 1971. Reviewed in *The Actuary*, June, 1971.

1971 Annual Reports of the Board of Trustees of the Social Security (OASDHI) Trust Funds, House Documents Nos. 92-88, 92-89, and 92-87, dated April 19, 1971. Reviewed in *The Actuary*, October, 1971.

OTHER TOPICS

*Samuel H. Weese, *Non-admitted Insurance in the United States*, pp. 198, Richard D. Irwin, Inc., Homewood, Ill., 1971, \$6.50.

The first paragraph of the Foreword, by Dan M. McGill, provides the following summary:

"This is a study of a branch of insurance hitherto unexplored on a systematic basis. It is concerned with those insurance transactions that fall outside the regular scope of insurance regulation. It deals with insurance placed with companies not licensed to transact business in the state in which the risk is located. This type of insurance is regulated to some extent through so-called surplus lines laws that place the primary burden of compliance on agents and brokers that do business with the non-admitted insurers. The purpose of these laws is to give the insuring public an orderly access to the services of non-admitted insurers without giving the non-admitted insurers a competitive advantage over those companies that have sought admission to a particular state and comply with the general regulatory laws of that state. These laws are unusual in that their purpose is to legalize an activity that has been declared illegal by other laws. There are various types of non-admitted insurance activities, but this study was confined to that type that lies within the jurisdiction of state surplus lines laws."

Chapter 1 provides a clarification of terminology encountered in the field of nonadmitted insurance and a preview of subject matter of the remaining seven chapters of the book. The subjects covered are historical development, underlying reasons for the existing market, survey of current laws, critical analysis of state laws, marketing structure of the surplus lines licensee, composition of risks, and the author's views concerning future development in the nonadmitted insurance market.

S. Fred Singer, *Global Effects of Environmental Pollution*, pp. 218, Springer-Verlag, Inc., New York, 1970.

In December, 1968, the American Association for the Advancement of Science sponsored a Symposium on Global Effects of Environmental Pollution. The purposes of the symposium were to discuss "the worldwide effects which may arise from local pollution and try to uncover, if possible, hitherto unsuspected effects which might have serious consequences." The material was presented in accordance with the following general outline: "The afternoon session of December 26, 1968, dealt with the balance of oxygen and of carbon dioxide in the earth's atmosphere, and with the problems arising from nitrogen compounds in the soil and water on the earth. The second session, in the morning of December 27, was devoted to possible effects on global climate produced by air pollution, and to the problem of toxic wastes discharged into the oceans. The third session, in the afternoon of December 27, was devoted to a panel discussion at which an assessment was made of the urgency of various pollution problems, including a discussion of the public policy aspects." In the words of Philippe De Seynes, undersecretary-general for economic and social affairs of the United Nations, "the conclusion of the Symposium showed that the problem is not insoluble, but that sustained effort, locally, nationally and at the international level can reverse, or at least stop the trend."

Material from this symposium forms the backbone of the volume edited by

S. Fred Singer. The editor invited additional papers to supplement those presented at the symposium. The volume contains eighteen papers contributed by twenty-two specialists and is organized in four parts, each with an introduction by the editor. Part I deals with "Chemical Balance of Gases in the Earth's Atmosphere"; Part II, with "Nitrogen Compounds in Soil, Water, Atmosphere and Precipitation"; Part III, with "Effects of Atmospheric Pollution on Climate"; and Part IV, with "World-wide Ocean Pollution by Toxic Wastes." The volume also contains a brief commentary on some unsolved problems, a brief epilogue, biographical comments about the authors, an index of names, and an index of subjects.

Jay W. Forrester, *Urban Dynamics*, pp. 285, Massachusetts Institute of Technology Press, Cambridge, Mass., 1969, \$12.50. Reviewed in *The Actuary*, May, 1971.

REVIEWS FROM "THE JOURNAL OF THE INSTITUTE OF ACTUARIES"

Reviews in Vol. 96, Part III, No. 405

Actuaries and Financial Planning, pp. vii, 149, Butterworth, London, 1970, 30s.

A special edition published by the Institute of Actuaries Students' Society.

F. S. Hillier, *The Evaluation of Risky Interrelated Investments*, pp. xi, 112, North-Holland Publishing Co., Amsterdam, 1969, 50s.

C. L. Van House and W. R. Hammond, *Accounting for Life Insurance Companies*, Richard D. Irwin, Inc., Homewood, Ill., 1969, \$10.