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BOOK REVIEWS AND NOTICES*

J. A. Hamilton and D. C. Bronson, *Pensions*, pp. xii, 410, McGraw-Hill Book Company, Inc., New York, 1958.

The opening chapter outlines, in a general way, the reasons for pension plans, their place in the over-all scheme of personal security, and the desirability of maintaining a permanent program. This is followed by a chapter summarizing, in good fashion, the development of the Old-Age, Survivors, and Disability Insurance program and the Railroad Retirement Act. This approach is quite desirable since, in the United States, no employer pension program should be set up without full knowledge of the current governmental program of social security benefits. However, the authors are the victims of Congress's habit of liberalizing the program every second year, with the result that their book does not describe the Old-Age, Survivors, and Disability Insurance program as it is today.

The next two chapters, on "Types of Benefits," and "Basic Provisions of a Pension Plan," cover the essentials of planning such a pension program and should be particularly valuable to the employer's personnel man with this responsibility. Also pertinent in this connection is Chapter 5 on "Governmental Regulations," although much of it is taken up with the historical development of limitations upon deductions an employer may take in establishing his tax base and the taxation of employee receipts. Furthermore, the authors very properly point out that the Internal Revenue Code is subject to modification and that not only the law itself but also the Regulations, Bulletins, Mimeographs, and Rulings must be checked in the light of the provisions of a proposed plan.

In the area of pension planning this reviewer would have welcomed a more complete discussion of vesting rights, of which one aspect is the effect upon executive decision making. Other aspects are the relative merits of career average and final pay benefit formulas; problems are created for the latter by layoffs, sickness, short hours, incentive compensation to salesmen and other such conditions. The possibility of using alternate formulas as a solution to these and other problems might well have been mentioned.

Disability benefits are discussed not only in these early chapters but in many other parts of the book. Many readers will question the statement on page 39: "For the average wage-earner an ideal benefit would approximately reproduce the pay the employee was receiving before disablement, reduced by the amount of any disability benefits received under OASDI or Workmen's Compensation laws or from other sources." When the tax treatment of disability benefits and the subjective nature of the disability itself are taken into account, this statement seems even more questionable than a similar one to the effect that the ideal pension plan would continue full pay after retirement.

* 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*.

Chapters 7, 8, and 9 deal with funding mediums. The first two cover, respectively, trust funds and group annuity contracts. The third, headed, "Other Financing Mediums," not only refers to individual level premium insurance and annuity contracts, combinations thereof, and their group annuity counterparts, but also touches upon group term insurance, group term with paid-up, split funding, and variable annuities. These chapters will be read most carefully by the advocates of different funding mediums for, here and in other parts of the book, the authors do not restrict themselves to strictly factual material but get into the realm of opinion and in so doing are influenced by their own environment. Many insurance men, including this reviewer, will feel that the authors favor the other fellow and probably some trust men may have a similar feeling.

Turning to matters of fact, the explanation of the immediate-participation deposit administration contract beginning on page 151 leaves something to be desired, possibly because there are at least two methods of operating such contracts. Under one method, annuities are purchased only if the contract is discontinued; in the meantime, payments are made from the fund as in the case of a trusteed plan so that there is no need to adjust for actual mortality experience, this being automatic. Under the other method, annuities are actually purchased at guaranteed rates at time of retirement; a yearly valuation of liabilities for retired lives is then made and the unapplied fund adjusted accordingly. If such adjustment should be negative and exceed the unapplied fund, the insurance company still remains liable for the annuities already purchased. One other basic element that distinguishes each method from the customary deposit administration contract is that the interest rate guarantee is qualitative instead of quantitative, being based upon the insurance company's actual investment experience. In chapter 9, mention might have been made of the technique, under group insurance-annuity contracts, of having premiums payable after the date of retirement as a solution to the problem of funding benefits for employees near retirement age when the plan is adopted.

Actuaries will, perhaps, be most interested in chapters 6 and 10 to 13 which deal with funding problems. Chapter 6 on "Advance Funding," which serves as a general introduction to the subject, is no doubt a desirable prelude to the discussion of trusteed and insured mediums of financing because both are concerned with advance funding. The chart on page 115 illustrates graphically the incidence of cost by different funding methods. However, the reference to the minimum advance funding base on page 114 is not too clear.

A very readable analysis of the elements which particularly concern the actuary in estimating the cost of a pension plan is presented in chapter 10 on "Actuarial Assumptions." The factors which influence these elements are given: for example, the variations in mortality rates by age, sex, geographical location, race, marital status, industry, occupation, and economic status are fully discussed. Similarly discussed are the factors affecting withdrawal rates, disability rates, salary progressions, etc. A number of tables are presented in this chapter which clearly show how mortality rates have improved over the years and the unsuitability of using population mortality tables for groups of persons selected either by insurance company selection processes, the self-selection of purchasers of annuities, or the selection by participation in the working population. With the history of past mortality improvement in mind, the authors very properly state that "allowance must be made for possible mortality improvements in the future." However, for noninsured plans they are apparently quite willing to use as a base mortality table one which reflects current mortality experience with no margins. This seems a little at variance with their acceptance of the desirability of having a margin in the interest assumptions. One might question also whether the effect upon pension costs (even when expressed as a percentage of payroll) of increases in pay as a result of rises in cost of living is not dismissed too lightly on page 218.

The differences between various methods of funding pension benefits are illustrated in chapter 11 on "Funding Principles" by reference to a hypothetical population. The authors have done a creditable job in covering pay-as-you-go, terminal funding, level cost from age at entry into plan for all benefits, and level cost from age at entry into plan for future service benefits with immediate payment of past service liability. This reviewer then expected to see an explanation of funding by payment of the level cost of future service from age at entry into service (there is a reference to this method of funding in a footnote on page 289), with an explanation of how the past service liability for this method of funding differs from that in the last previously mentioned method of funding. Instead the authors discuss such highly theoretical funding methods as payment in full at date of entry into plan of the cost of all pension benefits for both past and future service, and payment at date of establishment of the plan of such an amount that the interest thereon will fully support into perpetuity all the benefits payable thereafter to all existing and new employees.

By assuming the investment supporting the fund to be the business resources of the employing company, this last approach is likened on page 233 to the pay-as-you-go financing method. The point is then made that the pension plan reserve fund should not be invested in the employer's own securities. While this reviewer is in complete agreement with this principle, it seems that the authors are indulging in a whimsical intellectual exercise and would do better to point out that investing completely in employer securities is not much better than creating a book liability for the full reserves. Even this, as the authors expressed it, disregards legal rights and priorities and claims. In practice, a pay-as-you-go pension plan is rarely accompanied by a book liability of actuarially calculated reserves on a conservative basis which would at least avoid paying out as current earnings amounts that are a proper charge against current operations.

Chapter 12 on "Costs of Benefits" summarizes, in some 40 pages, the results of what must have been months of calculations and shows arithmetically the impact upon pension cost estimates at sample ages (and for certain population distributions) of the various actuarial assumptions discussed in chapter 10. The multiplicity of tables, even with the interspersed comments, may prove somewhat bewildering to the reader untrained in mathematical analysis. The desirability of competent actuarial advice is clearly demonstrated.

With chapter 13, on "Valuation," the authors complete their discussion of the actuarial aspects of pension plans. Mention is made of the actuarial truism that prospective and retrospective valuations yield the same result if used correctly. In spite of the warning given by the authors, this reviewer wonders if the untrained reader might not be misled into applying retrospective methods when they are not appropriate. Actual practice would seem to require the use of prospective methods in pension plan valuations. This reviewer would have welcomed, in this chapter or elsewhere, a clear distinction between the problems of the insurance company actuary in evaluating the liabilities his company has assumed under a group annuity contract of the paid-up group annuity form or the deposit administration form, and the valuation by a consulting actuary of the employer liabilities under a pension program funded through the insurance company by means of a deposit administration contract.

Chapter 14 provides an excellent introduction to the development of union negotiated pension plans; where multi-employer plans are involved they introduce special problems in design and valuation. The four remaining chapters are concerned with widows' benefits and some of the problems connected therewith, public and nonprofit employee plans, profit-sharing plans, and an excellent discussion of pension plans in Canada. Perhaps the last chapter would have been improved by discussing the special problems of United States employers when employees are transferred to Canadian subsidiaries for what may not turn out to be a permanent assignment.

To the growing library of books on the subject of pensions, the current book is a worthy addition. As the flyleaf says, it "is a textbook complete enough for use at the college level."

HENRY E. BLAGDEN

*G. M. Osborn, *Compulsory Temporary Disability Insurance in the United States*, pp. x, 232, Richard D. Irwin, Inc., Homewood, Illinois, 1958.

This book stems from a doctoral dissertation prepared under the academic program of the S. S. Huebner Foundation for Insurance Education. The purpose of the study is to determine, on the basis of experience here and in Europe, the feasibility of compulsory temporary disability insurance in the United States. The first few chapters provide a brief review of the nature, causes and extent of disability, and the commercial insurance coverages currently offered. A brief history is then given of compulsory disability insurance in Europe and the United States. The next few chapters are devoted to a description and analysis of the California, New Jersey, Rhode Island and New York plans, including the development of the laws, the extent of the coverage, the type of benefits offered, and methods of financing and administration.

Several chapters are devoted to an analysis of problems as well as probable trends in the following areas for each of the four current state plans: (*a*) the administrative problems involved in extending coverage to all workers, including the self-employed and farmers; (*b*) problems relating to qualifying conditions for benefits, and the type and amount of benefits offered; (*c*) the cost of providing various types of benefits, and problems relating to financing; (*d*) the financial experience of state funds; and (*e*) the experience of private insurance companies in the state disability insurance field.

The concluding chapters cover administrative and legislative problems confronting states which are considering compulsory temporary disability insurance and include arguments for and against the provision of coverage through private insurance companies rather than state funds. Arguments presented in favor of exclusive state funds are: (*a*) the state fund is simplest and cheapest to administer as acquisition costs are eliminated, premium taxes are not required and the cost of supervising private plans is avoided; (*b*) lower unit costs result if the state fund covers all workers rather than having private plans cover some and the state fund the balance; and (*c*) since the insurance is compulsory, a profit to an insurer isn't justified as it results in payment of benefits lower than might otherwise be possible. The author mentions that the relatively large number of problems which have arisen in Rhode Island, an exclusive state fund system, have brought this system into ill repute. He states that this is unfortunate since many of the problems have been due to the specific law rather than the system itself.

In reviewing the issue of federal legislation rather than state plans the author points out arguments which are presented in favor of a federal program, namely (*a*) state plans will result in a disparate patchwork of coverage, benefits, financing and administration; (*b*) state plans lead to cost differences among competing firms if some states pass laws and others do not; and (*c*) the present social security program covers permanent disability and can be readily extended to cover temporary disability.

The author concludes that there is need for compulsory temporary disability insurance, in view of the fact there are only three-fifths of the working population who have voluntary protection. He points out that some of these have inadequate coverage and the prospect seems to point to a very modest extension of voluntary disability income coverage. (Surveys of the Health Insurance Council reveal that 42,139,000 workers were covered under voluntary plans as of December 31, 1957 compared with 38,077,000 as of December 31, 1952.) According to the author, legislation will spread to other states and coverage will be broadened until nearly all workers are included under the plan.

The study also discusses financial experience of the various state plans through 1955 and thus does not cover the heavier claim costs during the past few recession years. Some of the conclusions drawn by the author on the basis of the financial experience of the plans through 1955 are not applicable to the period of 1956–1958. Demonstrating the effects of recession, the California State Disability Fund showed an excess of receipts over disbursements for 1955 and 1956, but a deficit for 1957, as follows:

1955	$ 5,630,651
1956	2,634,362
1957	−3,142,220

As of June 30, 1958 it was estimated that the State Fund would operate in the red to the extent of 12 to 15 million dollars during 1958.

The author fails to point out that one of the biggest problems connected with a state disability plan is that it becomes a political football. For example, forty-nine bills were submitted at the beginning of the current session of the California Legislature to extend the state disability plan. Most of these provide for increased benefits without regard for adequate financing. These include increases in benefits from $50 to $65 per week, additional indemnity for dependents, increase in maximum duration from 26 to 39 weeks, benefits to be made retroactive to the first day, benefits for pregnancy, increase in daily hospital indemnity from $12 to $20, etc.

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Financing Old-Age, Survivors, and Disability Insurance, A Report of the Advisory Council on Social Security Financing, Washington, D.C., 1959, pp. 30.

R. J. Myers, "Methodology Involved in Developing Long-Range Cost Estimates for the Old-Age, Survivors, and Disability Insurance Program," *Actuarial Study No. 49*, Social Security Administration, May 1959.

The Advisory Council on Social Security Financing, created pursuant to Section 116(a) of the Social Security Amendments of 1956, expressed its duties as follows:

> The Council considered that its main responsibility under the statute was to study and report on the method of financing old-age and survivors insurance and disability insurance, the long-range costs of the programs, the sufficiency of the income provided by the law to meet those costs, the timing and the amounts of increases scheduled to be made in contribution rates, the base to which the contribution rates are applied, the statutory provisions and the policies relating to the management and investment of the trust funds, and similar matters directly related to the financing of the program.

The character of *Actuarial Study No. 49* (the second item under review), in particular the two Appendixes, grew out of recommendations of the Council. Appendix I is entitled: "Principles Underlying the Financing of the Old-Age, Survivors, and Disability Insurance Program" and Appendix II is entitled: "Summary of Basic Procedures Used in Reviewing or Revising The Old-Age and Survivors Insurance Schedule of Contribution Rates." These serve as supplements to the Report of the Council and are adaptations of an unpublished report of its actuarial subcommittee.

The Council was comprised of distinguished individuals[1] from different fields of activity who, the law stipulated, "shall to the extent possible, represent employers and employees in equal numbers, and self-employed persons and the public."

The unanimity of the Report is evidence that the Council, in reaching its particular conclusions, functioned objectively and that each member, in the

[1] Two members of the Society of Actuaries, Carl H. Fischer and Reinhard A. Hohaus, were appointed to the Council.

course of deliberations, acted as a highly qualified individual rather than as a formal spokesman for the interests of a particular segment of society.

In any discussion of the Report, the significance of the statutory limitations on the duties of the Council and its understanding of its terms of reference thereunder should be emphasized and appreciated. Such limitation and understanding may have facilitated the achievement of a unanimous report and doubtless accounts for the fact that there are many significant aspects of the Social Security Act on which the Council was silent. But for such limitation and understanding, it would not have been surprising, in a field as controversial as social insurance, for genuine differences of opinion to develop within such a diverse group as made up the Council and for majority and minority reports or opinions to appear. It may be assumed that the Council recognized that there are controversial matters not referred to in its Report, the pros and cons of which could and should be thoughtfully debated in the interests of public education and welfare.

The Council gives its major finding as follows:

> The method of financing the old-age, survivors, and disability insurance program is sound, and, based on the best estimates available, the contribution schedule now in the law makes adequate provision for meeting both short-range and long-range costs.

What is the method of financing which the Council declares is "sound"? Although the Report does not give a definitive, concise statement, Appendix I of *Actuarial Study No. 49* does have an excellent analysis and description of the over-all operation of the method. Neither of these sources describes its application to individuals, who will have an infinite number of variations in earning levels and years of contribution. Even more important, nothing is said regarding the relative impact of the financing method as between the class of initial participants and the class of new entrants.

In Appendix I of *Actuarial Study No. 49*, the evolution of the principles underlying the financing of the OASDI program is outlined. Contributions by and in respect of active workers are the *primary source* of the money for *current benefit payments*. A fund of "modest amount," arising from the difference between current contributions and benefit payments, permits a contribution schedule which progresses in an orderly, known manner, acts as a buffer for variations in contribution and benefit outlays and provides a modest current income source from interest earnings.

Out of a prolonged debate and discussion in which persons from all walks of life participated, we have created a method of financing for which no single technical term has yet been found. "Limited reserve" or "modified pay-as-you-go" have been used but do not suggest the extent of the "limitation" or "modification." Economists usually include social security benefit payments in what they call "transfer payments." Since current contributions, the primary source of financing, are merely transferred to beneficiaries, perhaps the most descriptive term is the "transfer" method of financing. This is preferable to "pay-as-you-go" since this term has a very prudent connotation in private and public finance management—a connotation which hardly seems appropriate to "pay-as-you-go" pension financing.

We read in Appendix I:

> As is often the case in this country, the answer was arrived at through a pragmatic political process rather than a theoretical philosophical process. And, as is also often the case, the pragmatic process has resulted in an answer which has, to date at least, worked out satisfactorily. Just as the benefit formula is a blend of equity and adequacy, with much greater emphasis on the latter, so is the financing a blend of "reserve" and "pay-as-you-go," with the latter having the greater weight. Both of these blends, with the weight shifted to "adequacy" and "pay-as-you-go" respectively, were inherent in the 1939 Amendments and have met the very severe tests to which they have been subjected in the unprecedented conditions of the last 20 years.

The most significant statement in Appendix I, which might well have been made in the Report of the Council, is the following:

> The essential security of this plan rests, in the final analysis, upon the taxing power of the United States Government and the willingness of the people to have it exercised.

In addition to its major finding, the Council endorses the present system of contributions by employees, employers and the self-employed; it agrees that there should be a maximum on the amount of earnings subject to tax and creditable toward benefits, which maximum should be increased from time to time as earnings rise; it approves the present schedule of contribution rates with some question as to the increase to be effective in 1969; it endorses the long-standing practice of having a statutory contribution schedule designed to maintain the system substantially in actuarial balance for the indefinite future; and it affirms that a trust fund should continue to be maintained for contingency purposes and as a source, but not a major one, of investment earnings to meet a part of long-range costs.

The Council made one important recommendation as to the nature of the actuarial estimates. Previous estimates have been based upon assumed long-range trends which produced a fairly narrow range in possible costs for the shorter-run future. The recommendation is made—and an appropriate one it is—that possible variations arising from economic factors be recognized for estimates of expected operations over a short-run period. Perhaps some of the embarrassment which arose from social security contributions being less than benefits during 1957, 1958, and 1959 would have been avoided had there been published a wider range of possible variations for the short-run.

One new funding principle was advocated by the Council. It believes that "when the contribution rate approaches the level of a reasonable minimum estimate of the costs over a period of many decades into the future, decisions about the imposition of further rate increases, if needed, should be guided largely by estimates covering a period of 15 or 20 years." Although the condition stated is rather vague, there is a sensible practicality about taking a middle-range view of probable costs when the system becomes more nearly mature.

As to the management and investment of the Trust Funds, the Council recommended three changes in the law.

(1) "The rate on each special obligation should be equal to the average *market yield* on long-term marketable Federal obligations outstanding when the special obligation is issued, rather than to the average *coupon rate* of such marketable obligations."

(2) ". . . the interest rate fixed for a special obligation should be based on the average rate of return on all outstanding marketable Federal obligations that will mature more than, say, 5 years after the date of the special issue, rather than on all bonds that are not due or callable until after 5 years from the date when they were originally issued. . . ."

(3) ". . . adoption of a provision allowing purchase of marketable securities only when such purchase is in the public interest and would provide currently a yield equal to or greater than the alternative of investing in special issues."

The first and second recommendations are sound. Their purpose is to make the rate of return on special obligations as nearly as possible equal to "what the Treasury would pay for long-term money if borrowed from other investors."

As to the third recommendation, it is interesting to note that the present law provides that special obligations shall be issued only if the Managing Trustee determines that the purchase of marketable securities "is not in the public interest." The purpose of the recommendation is to have "the bulk of the funds . . . invested in special obligations [which] has the great advantage of avoiding disturbances of the capital market." These questions may be asked as to this recommendation:

a) Since, in the very nature of things, there will always be some marketable securities with a yield greater than the average, will there not always be a financial incentive for the trust funds to purchase such securities in the open market?
b) Will this encourage the use of the trust funds as a continuing pegging operation in support of government bond prices?
c) In view of legitimate differences of opinion as to what is in the public interest, will one course of action, considered to be in the public interest from one viewpoint, constitute an undesirable market disturbance from another view of the public interest?

The answers to the above questions may suggest that the "advantage of avoiding disturbances of the capital market" be maximized by restricting investments solely to special issues.

The Board of Trustees, in its 19th Annual Report (issued as of March 1, 1959), accepted these recommendations in general, but held the opinions that the period for determining the interest rate on special issues, under the second recommendation, should be 3 years (rather than "say, 5 years"), and that, under the third recommendation, the purchase of marketable securities should not be restricted by requiring a yield equal to or greater than that of current special issues (in the past this condition has always been satisfied).

What are some of the things about which the Council was silent?

In declaring that the method of financing is sound, did they mean that it would be so for any level of benefits and corresponding contributions? The Report does not say. It may fairly be presumed that the Council had in mind the plan now in existence or any reasonable modification thereof, and not major different levels of contribution and benefit. If this is correct, it would have been helpful had the Report so stated. The general endorsement of the method of financing may give undue comfort and support to those who are making repeated legislative proposals for substantial liberalization of benefits and increase in contributions.

Although the Council considered that its duty was to study and report on the base to which the contribution rates are applied, it merely stated: "the maximum should be increased from time to time as wages rise." No guiding principle was given. The phrase "basic floor of protection" does not appear in the Report. The Council did agree unanimously that "exactly where this maximum should be set is a difficult question."

The Council pointed out in a footnote that, in the relation between the tax on earnings and OASDI benefits, "there is an element of progressive taxation" since

> Covered workers who, together with their employers, pay taxes on the higher ranges of the creditable earnings base receive less than proportionate benefit rights. This serves to make possible more than proportionate benefits for those paying taxes on the lower range of the creditable earnings base.

The Council failed to make clear an important qualification as to this alleged progressive taxation—a qualification which the Canadian Life Insurance Officers Association, in its recent study of old-age security,[2] stated in this way:

> . . . the system [OASDI] is designed ultimately to have the higher income contributors subsidize the lower income ones. However, because of the partial pay-as-you-go nature of the program, this principle will not come into play for many years to come and at the present time [1956 law] some higher income married contributors retiring under the system can become entitled to benefits which are as much as $22,000 greater in value than the contributions which they have made. Lower income contributors who retire also enjoy a subsidy but a substantially smaller one.
>
> As well as this, the successive revisions in the system which seem to occur in each election year are usually of such a character that they produce bigger windfalls for the higher income contributors than for the lower ones.

Illustrative calculations accompanying this statement indicate that the "contributions" mentioned are the combined contributions of employee and employer.

In 1958, when the maximum earnings base was raised to $4,800, the boosting of "windfalls" of the kind mentioned happened again for those who are earning more than $4,200 and who are in the middle and older age groups. Furthermore, such boosting will continue in the future as benefits are increased by raising the earnings base. Increase in such base from time to time as wages rise is endorsed by the Council and is considered in the actuarial projections of cost. The fact is that, as to *value of benefits*, contributions with respect to higher income persons in the middle and older age groups will never subsidize the lower income

[2] Memorandum on Old Age Security—The Canadian Life Insurance Officers Association, June, 1958.

persons. Indeed, the "subsidy" may be considered to be financed eventually by employer contributions with respect to new entrants and currently younger persons, with the self-employed in these categories also bearing a significant part of the burden.

The Council did not refer to the significance of the income tax treatment of OASDI contributions and benefits since this matter presumably was deemed outside its terms of reference. It would be desirable to explore such significance which would involve an examination of two important questions: (1) is the OASDI system, in fact, self-supporting, as is commonly accepted, and (2) does the tax-exempt treatment of OASDI benefits actually result in regressive taxation under the over-all operation of the system?

Of particular interest to actuaries is the Council's examination of the actuarial assumptions and techniques used for the cost projections made by the Chief Actuary of the Social Security Administration. It is a great tribute to Robert J. Myers that the Council found the actuarial assumptions reasonable and the estimating techniques appropriate and sound. For actuaries of private companies who are accustomed to have a public agency review their work, it is interesting to note that we have here private professional men reviewing the work of a public officer—another application of the American system of checks and balances.

Appendix I of *Actuarial Study No. 49* concludes with a summary statement that "continued successful operation of the plan requires not only annual appraisal of the operating results, but also re-examination at regular intervals of the techniques and assumptions for the long-range estimates." In Appendix II, the basic technical procedure for testing the contribution schedule is described. This procedure consists of three major steps:

(1) Using the "open group" technique, a forecast is made for many decades in the future of the annual disbursements for benefits and expenses. Two sets of benefit disbursements are prepared—"low-cost" estimates and "high-cost" estimates.

(2) The two yearly disbursement estimates so computed are converted into percentages of yearly taxable payrolls. These percentages represent the "low-cost" and "high-cost" contribution rates which would be required on a strictly pay-as-you-go basis.

(3) The statutory schedule of contribution rates is reviewed to determine if it should be revised. This is done in several substeps.

   a) A single theoretical schedule of pay-as-you-go contribution rates is derived by averaging the "low-cost" and "high-cost" rates and is called the "intermediate-cost" schedule.

   b) A level-premium cost of benefits and administrative expenses, as a percentage of taxable payroll, is computed from the "intermediate-cost" estimates.

   c) Such level-premium cost is adjusted by subtracting the level-premium equivalent of the interest earnings on the amount of the trust fund on hand at the starting date.

d) There is then determined the level contribution rate that is the equivalent to the increasing schedule of rates in the existing law.

e) This equivalent level contribution rate can then be compared with the net level-premium cost of disbursements.

f) Finally, any necessary increases or decreases in contribution rates to compensate for differences can be studied.

ANNUAL RATES OF MORTALITY IMPROVEMENT

Age	Population Projection				Projection Scale C*
	Low-Mortality		High-Mortality		
	Males	Females	Males	Females	
20–24......	0.94%	1.30%	0.18%	0.53%	1.25%
25–29......	1.05	1.38	0.25	0.61	1.25
30–34......	1.30	1.55	0.61	0.73	1.25
35–39......	1.34	1.51	0.58	0.67	1.25
40–44......	1.38	1.51	0.53	0.67	1.25
45–49......	1.38	1.46	0.50	0.64	1.25
50–54......	1.42	1.46	0.40	0.64	1.25
55–59......	1.42	1.46	0.37	0.64	1.25
60–64......	1.42	1.46	0.30	0.67	1.25
65–69......	1.42	1.46	0.30	0.58	1.25
70–74......	1.08	1.12	0.27	0.50	1.15
75–79......	0.79	0.79	0.25	0.47	0.87
80–84......	0.53	0.58	0.27	0.27	0.53
85 and over.	0.37	0.58	0.13	0.13	0.20

* *TSA* IV, 272.

Actuarial Study No. 49 is a clear and competent fulfillment of the following recommendation of the Subcommittee on Actuarial Cost Estimates of the Council:

> We also recommend that the Actuary adopt the practice of assembling in a single report a detailed description of the technique used in making cost estimates, the actuarial formulas and factors used and their bases or derivation, and the actual calculations. Such report would be a public document available to any one for reference or study purposes. It would also simplify the work of future Advisory Councils.

It may also find its way into the recommended course of reading for actuarial students! *Actuarial Study No. 49* relates to the provisions in effect following the 1956 Amendments, with indication as to how these estimates were modified to apply to the 1958 Amendments, and *Actuarial Study No. 50* is to cover revised extensive estimates for the 1958 Amendments.

The projection of mortality used in the cost projections, which is described in *Actuarial Study No. 46*, deserves special mention. It is made on the basis of the record for specific causes of death and is an innovation which should represent the results of a more considered opinion. Advantage was taken of the opinions of statisticians in the National Office of Vital Statistics and the National Institutes of Health, who may be expected to be close students of mortality trends. In describing the projection, it is stated:

> . . . the low-mortality projection is intended to reflect a definitely optimistic view as to the future course of mortality rates, while the high-mortality projection is intended to reflect a pessimistic view, particularly with regard to the possibility of reduction in death rates for the diseases typical of old age. However, the high-mortality projection does contemplate some future improvement in mortality.

The equivalent annual rate of improvement assumed in these projections from 1953 to 2000 is shown in the tabulation on page 292 in comparison with Projection Scale C.

We are all indebted to the Council for performing an important public service. It is clearly evident that the Council devoted much careful study to its duties. The service they have rendered will be the greater if it stimulates study of the areas not covered in its Report. Some of the latter have been suggested in this review.

The measure of the soundness and success of our social security financing method will not be complete until its broad social and economic impact has been adequately explored and evaluated. In this connection, it is hoped that the study of the economics of pensions by the National Bureau of Economic Research, now under way, will prove to be most valuable.

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R. M. Clark, *Economic Security for the Aged in the United States and Canada*, 2 vols., pp. v, 861 (mimeographed), Department of National Health and Welfare, Ottawa, 1959.

The Canadian Government commissioned this report in the early months of 1958 when it requested Dr. Clark of the Department of Economics at the University of British Columbia to enquire into

> the facts relating to the old age security systems presently in effect in Canada and the United States of America with particular reference to those features of the old-age and survivors insurance program in the United States of America, which make it possible for higher benefits to be paid covering a wider range of contingencies at an earlier age than is provided under present legislation, and to report thereon as soon as may be possible.

A limited supply of the report has been reproduced in two volumes for distribution to Members of Parliament, Senators and other interested persons. This initial supply is now exhausted, but it is understood that the Queen's Printer will proceed to print the report if the demand for copies is sufficient.

The scope of the report may be indicated briefly by the following abridged version of the table of contents:

I The American Social Security Act of 1935
II Social Insurance and Private Insurance
III Old Age, Survivors, and Disability Insurance:
  1. Covered Employment
  2. Benefits

3. Administration
4. The Growth of Taxation to Finance Expanding Benefits
5. The Two Trust Funds and the Actuarial Soundness of the Program
6. Some American Opinions

IV Old Age Assistance in the United States
V Old Age Security Program in Canada
VI Old Age Assistance in Canada
VII Disability Allowances and Blind Allowances in Canada
VIII Selected Comparisons of Canadian and American Old Age Security Legislation
IX Employee Pension Plans in Canada and the United States
X Principles in Determining a Basic Government Pension and in Adjusting it for Changes in the Price Level
XI A Canadian Contributory Pension Program with Variable Benefits?

While the report is not likely to have an appeal for the man on the street, it is a well-written, lucid document that is singularly free of technical terms and economic jargon. For instance, at one point where a semilogarithmic chart is used to compare rates of change, Dr. Clark has taken the trouble to include two paragraphs giving a "short course" on the use of such charts. Essentially, he has written his report for the backbencher and for the person of something better than average intelligence.

The report will doubtless be criticized on several scores. First, it will be criticized because of its length. Dr. Clark sets out his terms of reference in the Introduction; 730 pages later he deals with them in four pages. Second, it may be said that the report contains some irrelevancies. For example, it has already been suggested that Dr. Clark's discussion of inflation has no place in a report of this kind.

Another area of criticism will be the apparent inconclusiveness of the report. Many will overlook that Dr. Clark was asked to make no recommendations and that he has studiously adhered to his terms of reference by refraining, with few exceptions, from expressing personal points of view.

Dr. Clark volunteers some forthright comments about the elements creating inflationary pressures. At one point he states:

> Political parties vie with one another in their promises of greater expenditures. . . . The great majority of speeches by private members are advocating either greater government expenditures or lower taxes and, not infrequently, both. Judging from these speeches one might reasonably infer that the typical member of the House of Commons or of Congress, especially when in opposition, is an inflationist whether he knows it or not.
>
> The only fully satisfactory way to protect all the aged against inflation is to prevent inflation. . . . My own conviction is that, while inflation is not inevitable, unless vigorous and co-ordinated policies to prevent it are put into effect, the price level will double again within the next two or three decades.

He speaks favorably of the benefits of competition in all fields and, particularly, in the savings field. He emphasizes the useful and productive role of the life insurance companies' investments and compares the companies' rate of earnings with the rate earned on the Canadian Unemployment Insurance Fund which is invested in federal government bonds.

As to the report itself, Dr. Clark sets as his primary objective "to bring together from widely scattered sources factual information on [the] complex topics" of the old age, survivors, and disability programs in the United States and Canada, a task which he accomplishes very effectively.

He writes: "The terms of reference preclude recommendations, but leave ample scope for comments which are not themselves recommendations. I have used this opportunity to add five chapters that would not be part of a purely factual description of existing legislation." Two of these five chapters contain "a summary of and comments on those arguments for and against a government contributory pension program in Canada with graduated benefits, which seem most important to me." The pros and cons are not offsetting or reconcilable and Dr. Clark intimates that the ultimate choice will likely depend on the aims and outlook of those making the decision.

Dr. Clark calls his short, concluding chapter a Postscript and offers the following explanation for the use of this term:

> I use the term "Postscript" rather than "conclusion," lest the remarks in the last section of this chapter be erroneously construed as recommendations to or away from a Canadian contributory government pension program with variable benefits.

Some of the more important, factual statements included in this Postscript are reproduced hereunder:

> The American Program does cover a wider range of contingencies than Old Age Security in Canada, in that it provides, on a non means test basis, survivors and disability benefits. It provides Old-Age benefits at an earlier age than does the Canadian Program. Subject to a retirement test, it pays these Old-Age benefits at age 65 for men, and, on an actuarially discounted basis, for those women who wish it, as early as age 62.
>
> . . . The proportion of the population age 65 and over in the United States receiving Old-Age benefits or Old-Age Assistance or both has increased from 44 per cent in December 1952 to 68 per cent in December 1957.
>
> . . . [In Canada] the proportion of the population age 65 and over in receipt of Old Age Security or Old Age Assistance has risen from 61 per cent in March 1952 to 72 per cent in March 1958. Thus the difference by which Canada has exceeded the United States in the proportion of the population age 65 and over in receipt of benefits under the two Programs in each country has diminished fairly rapidly since 1952.
>
> . . . In 1958 the Old Age Security pension equalled approximately 47 per cent of the average personal income in Canada. The minimum, average, and maximum payments of Old-Age benefits in March 1958 were 18, 39 and 65 per cent of estimated average personal income in the United States. . . . However, the benefits payable under the American Program were increased by seven per cent in January, 1959. Under the previous and the present benefit formulae the average benefits to various categories of beneficiary would continue to increase slowly for several years. As of 1958, however, the benefits under Old Age Security in Canada payable to single persons or married couples compare favourably with the average amounts payable to retired workers and their wives in the United States. . . .
>
> The American Program, unlike the Canadian, has remained financially self-support-

ing since its establishment. This result has been achieved partly at the expense of future generations, in the sense that in order to continue to pay benefits promised under the present Act it will be necessary by 1969 to have raised the contribution rates on taxable incomes. These rates are scheduled to be raised from the 1958 figures of $2\frac{1}{4}$ per cent on employee, $2\frac{1}{4}$ per cent on employers and $3\frac{3}{8}$ per cent on the self-employed to $4\frac{1}{2}$, $4\frac{1}{2}$ and $6\frac{3}{4}$ per cent respectively in 1969. . . .

I am much impressed with the strength of the case both for and against such a Canadian contributory pension program with variable benefits.

I am impressed by the complexity of some of the issues referred to. Vast sums of money would be involved in any major changes in legislation. The importance of allowing ample time for the preparation of any new legislation and for its consideration by Parliament is obvious. This point is illustrated by a statement in the White Paper of October 1958 announcing the proposals of the Conservative Government in Great Britain for a contributory pension program with variable benefits. It is estimated that "at least two years will be required" for the Government and for employers to prepare for the change from the present contributory program with flat rate benefits to one with flat rate plus graduated benefits.

The range of benefits above the flat rate minimum benefit that could be paid in the next decade under a Canadian contributory pension program presumably would be significantly less than that which will be paid in the United States. This would be the case even if the Canadian people were prepared to have a substantially higher proportion of their national income go into such pensions than will the people of the United States. There are three reasons for this.

(*a*) Benefits under such a Canadian contributory program would build up rather slowly. This is inherent in any contributory pension program, private or government, in which benefits are even approximately related to contributions.

(*b*) The Canadian contributory program presumably would start off from the present minimum payment of $55 a month. This compares with a minimum of $33 which has been achieved in 1959 in the United States after 22 years of collecting contributions for the Old-Age Insurance Program.

(*c*) The Canadian level of per capita incomes is some 30 per cent below that of the United States.

These statements are important because members of both major political parties have made some misguided comparisons of the old age programs in the United States and Canada to the detriment of the Canadian system, and have inferred that there might be some "magic" in the United States system. Dr. Clark has carefully dispelled this notion and has done so in this brief concluding chapter which is most likely to be read and studied first by the newspaperman and the politician-in-a-hurry.

In summary, it is the opinion of this reviewer that Dr. Clark has been conspicuously successful in preparing an unbiased report that will serve as a valued reference work in both Canada and the United States for some years to come.

B. R. Power

*Railroad Retirement Board, *Seventh Actuarial Valuation of the Assets and Liabilities under the Railroad Retirement Act as of December 31, 1956*, Annual Report for the Fiscal Year Ending June 30, 1958, Chicago, November 1958.

This annual report contains also the Seventh Actuarial Valuation of the Railroad Retirement System and statements of the Railroad Retirement Board and the Actuarial Advisory Committee. An extensive technical supplement is available in duplicate form. Although this valuation is made as of the end of 1956, supplementary calculations have been made as of the end of 1958 to reflect the effects of the Social Security Amendments of that year. The latter affected the financial balance of the Railroad Retirement System in two ways. First, the estimated gain from the financial interchange provision was reduced. Second, Railroad Retirement benefits paid directly were increased because of the effect of the higher OASDI benefits as they apply in the "social security minimum" provision.

As of the end of 1958, the actuarial deficiency of the Railroad Retirement system is estimated at 4.18% of payroll. This is in sharp contrast with the actuarial deficiency of 1.63% of payroll as of the end of 1953, under the provisions of law in effect at the end of 1955, as shown by the previous valuation. The sharp rise in the actuarial deficiency is due not only to the factors mentioned previously, but also to the effect of the 1956 amendments to the Railroad Retirement Act that raised benefits 10% without providing any financing and to the continuing deficit between the level tax rate required and the tax rate actually in effect.

Both the Railroad Retirement Board and the Actuarial Advisory Committee took a very serious view of the situation and expressed the belief that there was an urgent need for corrective measures to eliminate, or at least significantly reduce, the actuarial deficiency. In May 1959, Congress enacted legislation that produced this effect, namely by increasing the maximum earnings base from $350 to $400 a month and, more important, by an immediate increase in the contribution rates, with scheduled step increases at later times. However, part of this additional financing will be used to provide an increase of 10% in benefits and certain minor liberalizations.

ROBERT J. MYERS

Great Britain, Ministry of Pensions and National Insurance, *National Insurance Bill, 1959—Report by the Government Actuary on the Financial Provisions of the Bill*, pp. 14, Cmnd. 629, H.M. Stationery Office, London, January 1959.

This document presents the cost estimates for the Conservative Government's proposal in the field of old-age security, originally formulated in *Provision for Old Age—The Future Development of the National Insurance Scheme.*[1] The present report starts with an excellent summary of the proposed benefit and contribution provisions for the earnings-related system to be added to the existing flat-benefit plan. These variable benefits are only in respect to earnings between £9 and £15 a week and are proportionate to both average earnings on which contributions are paid and length of time for which such contributions are paid. It cannot be said that such benefits are proportionate to total contribu-

[1] Digested in *TSA* X, 811.

tions because certain contribution increases scheduled in the future are, in essence, not given credit in the benefit computation.

For the earnings-related feature, the employee rate (and, likewise, the employer rate) starts at $4\frac{1}{4}\%$ of covered earnings in April 1961 and increases to $4\frac{1}{2}\%$ in April 1965, with further rises of $\frac{1}{4}\%$ every 5 years until the ultimate level of $5\frac{1}{4}\%$ is reached in 1980. The combined employer-employee flat contributions proposed for the present flat-rate benefits (including the contributions for industrial injury benefits and toward the cost of the National Health Service, which represent 20%–25% of the total contributions) may be considered as a percentage of the minimum earnings limit of the earnings-related plan. The resulting figures for men for various future years very closely approximate the contribution rate for the earnings-related plan; for women they are lower by about 1% of pay. Thus, in essence, there is a smooth junction at the point in the wage scale where the flat-rate plan passes to the earnings-related plan. However, for persons with earnings below those covered by the earnings-related system, the proposed flat-rate contributions are lower than those now in effect.

The earnings-related benefit for a man retiring at age 65 is at the rate of 26*s.* a year for each 150*s.* of contributions by the covered individual, not counting any contributions resulting from the scheduled increases in the rates beginning in 1965. For a woman retiring at age 60, the corresponding basis is 26*s.* a year for each 180*s.* of contributions. The above figures, which in each instance are exactly half of those described in the report cited in the first paragraph, arise from a small change subsequently made in the proposal.

Under some circumstances, "contracting out" is permitted in the case of individuals who are members of a private pension plan that satisfies certain conditions. However, this "contracting out" would be only for the supplementary earnings-related part of the program and not for the universal flat-pension portion. In this respect, it differs from the "contracting out" that was considered, but rejected, two decades ago in the United States when our system was being enacted. In fact, the persons contracted out will not pay the new, reduced flat-rate contribution but rather will continue to pay the same higher amount as at present. In such cases, the effect will be that those with earnings just above the minimum covered by the earnings-related plan (up to about £11 for men and £10 for women) will, if contracted out, pay higher contributions than they would if not contracted out and yet will receive only the flat-rate pension and no graduated pension.

The major portion of the report is devoted to a presentation of long-range actuarial cost estimates for both the present system and the proposed one. The estimates have been made on the projection basis, using a single estimate rather than a range. Figures are shown for every fifth year from the fiscal year 1961–62 up to 1981–82 and then for 1991–92 and 2001–02.

Under the present plan, the annual deficit of income in relation to expenditures is about £150 million in the early years of operation, rising to about £400 million in 20 years and thereafter. Such deficits are to be made up from general funds. Under the proposed plan, however, the income and outgo would be substantially in balance during the next 20 years, while for the following 20 years there would be a small excess of income over outgo (ranging generally at about £50–100 million a year). Under both plans, annual income from interest is shown to be constant at £50 million, thus implying a fixed fund. This, of course, is the case under the present plan, but would not be so for the proposed plan in the later years if the above-mentioned excesses of income over outgo occur (but these might well not be permitted since the stated basic financing principle is "pay-as-you-go").

Under the present plan, general funds not only make up the deficits but also provide an annual "Exchequer supplement" of about £125 million in all years in the future. Similarly, under the proposed plan, there would be "Exchequer supplements," based on one-fourth of the total contributions for the flat benefits (one-third in the case of self-employed and nonemployed persons), with a prescribed minimum of £170 million in any year. Thus, under the proposed plan, the "Exchequer supplement" would increase from £170 million in the early years of operation to somewhat more than £200 million in 25 years and thereafter. Accordingly, under the proposed plan the annual "Exchequer supplement" would be about £45 million more in the early years and £75 million larger eventually, but no general annual deficit of about £150 to £400 million would have to be met.

As the report points out, the deferred nature of the benefits under the earnings-related plan produces a higher rate of increase in benefit expenditures than under the present plan. Moreover, the deferred nature of the earnings-related portion of the program is indicated by the fact that after 40 years, its cost represents only about one-sixth of the total outgo for pensions.

An appendix discusses the bases and assumptions of the estimates. Revised population estimates by quinquennial age groups and sex are shown for each 5 years from 1957 to 1977 and then for 1987 and 1997. These reflect a marked change in fertility rates since 1955. A very important assumption was made in regard to the future course of earnings, namely, the dynamic one that earnings would increase at the rate of 2% per year; at the same time, the provisions of the plan in regard to the lower and upper earnings limits covered by the earnings-related system and in regard to the flat benefits are taken as static. It seems unlikely that if wages doubled in 35 years (as under the 2% assumption), no changes would be made in these elements (and thus in the financing of the flat benefits). Another important assumption—although one that does not apparently particularly affect relative costs—is the number of persons who will be "contracted out" of the supplementary earnings-related plan. This number is placed at 2½ million persons, representing about 10% of all covered employees and close to 20% of those above the minimum earnings limit.

The actuary who is engaged in social security cost estimating is faced with a difficult problem in using the projection method. These difficulties are not really avoided in using the "balance sheet" method, under which lump-sum present values are obtained for future income and outgo, but rather they are obscured from open view. The problem is how far into the future the projections should be made. If the period is more than a few decades, many laymen criticize the actuary for being a visionary who produces completely impractical theoretical results. Yet, as actuaries, we know that costs for old-age benefits will generally rise for many years because of the gradual maturing of the population and that there may well be further rises if the benefit system is of a long-deferred nature. Certainly, the latter is to a considerable extent the case under the proposed British plan, and this is even more the case under the assumption that earnings rise steadily in the future.

The Government Actuary has chosen a projection period of 40 years. No discussion is given as to why this particular length of time was selected or as to the cost trends beyond then. In fact, it is stated that even 40 years is an extremely long period, considering the variation possible in population estimates, but that it is necessary to take such a period to illustrate the gradual build-up of the graduated pensions.

The cost estimates for the OASDI system of the United States extend for about 90 years into the future, in an attempt to show the ultimate situation. With this long-term outlook in mind, this reviewer has undertaken some illustrative calculations for a simplified theoretical plan, somewhat similar to the proposed British one. These computations have been made to determine how long such a plan requires to reach maturity and what proportion of maturity is attained in various shorter periods in the future.

The model is a population already stationary in accordance with the U.S. Total Males Life Table for 1949–51, with the assumption that all births occur at the beginning of the year. It is also assumed that all individuals begin work at age 20 and retire at age 65, with uniform earnings at each age. Two assumptions as to the secular trend of earnings are made, (1) level earnings of $240 per month in all future years and (2) monthly earnings of $240 in the first year of operation, increasing by $4 for each future year until an ultimate level of $300 is reached in the 16th year of operation. The latter assumption is intended to approximate, in a fashion that is simple for the computations, the effect of a 2% compound annual increase, taking into account that the assumed maximum covered earnings is $300.

The provisions of the hypothetical plan are as follows:

a) Flat pension of $600 a year for all persons aged 65 and over, including those beyond this age at the beginning of the plan;

b) Additional graded pension of $52 per year for each $300 of cumulative contributions;

c) Contribution rate for graded pensions amounting to $4\frac{1}{4}\%$ of earnings in excess of $180 a month but not in excess of $300 a month.

It will be observed that the above hypothetical plan closely parallels the proposed British plan, at least insofar as old-age pensions to covered male workers are concerned. No consideration is given to supplementary benefits for wives or to survivor benefits for widows and orphans. In fact, it may be observed that the monetary figures reflect a relationship of 1 shilling per week corresponding to $1 per month, which incidentally is perhaps not an unreasonable ratio based on cost-of-living and earnings levels. It may also be noted that, in essence, this hypothetical model relates only to the portion of the coverage with earnings sufficient to be covered by the graded pension provisions. For purposes of illustration of the effect of a rising earnings assumption, no new entrants from the lower-earnings categories are assumed. Likewise, it is assumed that all individuals reach relatively soon the maximum creditable earnings limit (which is static in the proposed British plan, as contrasted with the dynamic earnings assumption).

The results of the calculations are summarized in the accompanying table, separately for the level and increasing earnings assumptions. Also shown is the

Year of Operation	Level Earnings Assumption		Increasing Earnings Assumption	
	Graded Pensions	Total Pensions	Graded Pensions	Total Pensions
1	....	4.25%	....	4.25%
5	.11%	4.28	.09%	4.01
10	.47	4.36	.35	3.81
15	1.01	4.50	.68	3.71
20	1.66	4.66	1.19	3.88
30	3.12	5.03	2.54	4.42
40	4.62	5.40	4.02	5.01
50	6.02	5.75	5.47	5.58
60	6.62	5.90	6.37	5.95
70	6.76	5.94	6.69	6.08
80	6.76	5.94	6.75	6.10

cost of the graded pensions relative to the payroll giving rise thereto and the cost of the total pensions (both flat and graded) relative to the total payroll below the maximum earnings limit.

First, considering the level-earnings assumption, the cost of the total pensions rises from 4¼% of payroll in the first year of operation to 5.4% after 40 years and to an ultimate cost of 5.9% in the 60th year and thereafter. To put it another way, the relative rise from the initial cost to the ultimate cost is 40%, two-thirds of which occurs in the first 40 years. Similarly, the cost of the graded pensions, when measured against the payroll giving rise to them, increases from a very small figure in the early years of operation to 6.8% ultimately, with the figure for the 40th year being two-thirds thereof.

On the basis of the increasing-earnings assumption, the cost of the total pensions actually decreases for the first 15 years of operation, declining from 4¼% in the first year of operation to 3.7% in the 15th year. Thereafter, there is a steady rise until the ultimate cost of 6.1% is reached in the 80th year. Thus, the relative increase from the initial figure to the ultimate one is 44%, and only two-fifths of this occurs in the first 40 years of operation. The cost of the graded pensions relative to the payroll on which they are based rises from a negligible figure in the early years of operation to 6.8% ultimately, with about three-fifths of this rise taking place during the first 40 years.

The foregoing analysis indicates that under a plan where the graded benefits are long-deferred, as that proposed for Great Britain, the increase in the cost for the first 40 years of operation understates the entire rise to be expected before the program matures. This is especially true when the period of deferment is lengthened as the result of an increasing-earnings assumption. Of course, the figures developed for the hypothetical plan do not carry over directly to the proposed British plan since there are many complicating elements present therein that have not been taken into account in the model. Nonetheless, there seems to be clear indication that, under the proposed British plan, considerable increases in cost will accrue beyond the 40-year period used in the cost estimates.

ROBERT J. MYERS

*P. R. Rider and C. H. Fischer, *Mathematics of Investment*, pp. xi, 359, Rinehart and Co., Inc., New York, 1951 (Fourth Printing July, 1958).

Books on the subject customarily called mathematics of investment or finance are not lacking. They vary in purpose, length, difficulty, completeness and relative emphasis on mathematics and business practice. As for *Mathematics of Investment*, its authors state, "The chief purpose of this book is to provide an introductory course in the theory and applications of compound interest and annuities certain. . . . It has been the aim of the authors to present mathematics of investment and insurance in such a way that the typical student in a school of business administration may obtain a working knowledge of the elements of the subject, which should be of real value to him in his study of accounting, in his personal finances, and in his business career. However, there is a sufficient amount of more advanced material to arouse the interest of a student who has had more than the minimum of mathematical training." The authors develop this purpose at an intermediate level of difficulty with, in general, reasonable completeness, yet without wearisome detail. They write with clarity in an easy style, often presenting the rationale behind certain practices and appealing to the reader's common sense. Mathematical theory is not stressed and no calculus is required. In contrast, for example, Donald's *Compound Interest and Annuities-Certain*[2] emphasizes the mathematical aspects and theory, is more advanced and is directed primarily to the actuarial student.

In their initial chapter, Rider and Fischer develop simple interest and simple discount rates in parallel. The chapter concludes with a useful topic rarely presented, the rate of interest on short-term installment contracts. Here, as in several later instances, the mathematical formulas are stated only in a problem

[2] Reviewed in *TSA* VI, 617.

list. Deeper student understanding of partial payments ideas might have been obtained if compound interest had first been introduced.

In the second chapter, the basic compound interest formula, $S = A(1 + i)^n$, is established for n a positive integer and is extended *by definition* to n any positive number. If knowledge of the calculus had been presumed, so that restriction to the discrete case had not been necessary, compound interest for a nonintegral number of interest periods could have been made logical. Missing here are (1) comparisons of simple and compound interest and (2) the theory of compound discount, mentioned very briefly in chapter 7 as an offshoot of a depreciation method.

The third and fourth chapters cover ordinary annuities and more general annuities, respectively, as comprehensively as this reviewer has seen at this level. For the general annuity immediate of uniform rent, there is presented a *single* method (covering all the practical cases) which yields the pair of formulas

$$S = R\, s_{\overline{k}|\,i}^{-1}\, s_{\overline{n}|\,i} \quad \text{and} \quad A = R\, s_{\overline{k}|\,i}^{-1}\, a_{\overline{n}|\,i}\,.$$

Special tables of $s_{\overline{k}|\,i}^{-1}$ are provided for the common nonintegral values of k. Inclusion, though brief, of a section on the valuation of an annuity on any date is noteworthy and leads into the important special cases, deferred annuities and annuities-due. Apparently, the authors fail to take full advantage of their unified general annuity treatment when they relegate the basic annuity-due formulas to a problem, with no verbal interpretation. In fact, to one with actuarial training, the over-all lack of verbal interpretations, especially in these annuity chapters, may seem unfortunate. The varying annuity with payments in arithmetic progression is developed, but not the equally interesting one with payments in geometric progression. At times, as in the varying annuity section, the algebra used seems unnecessarily tedious.

Debt repayment by amortization and sinking fund methods is the subject of chapter 5. There follows an outstanding chapter on bonds, characterized by an excellent description and careful terminology. The usual methods for determining price and book value both on and off coupon dates, for constructing bond schedules and for determining yield appear. The section on callable bonds is interesting, particularly the illustrative example shedding light on premium bonds callable above par. It is unfortunate that book values in one bond table illustrated are obtained by accumulating at *compound* interest the book value on the preceding coupon date and then deducting the proportionate coupon, and also that no comment is made thereon. Hence, interim book values on bonds yielding the coupon rate are inconsistently shown below par. The customary method (and that of the text) in which the interim accumulation is at *simple* interest, *is* consistent, moreover.

Depreciation, depletion, capitalized cost and reinvestment rates are the subject of the final chapter on interest. Then follow three good introductory chapters on life contingencies dealing with annuities, net premiums and reserves.

With its splendid exposition, well-chosen illustrative examples, use of the time diagram technique, stress on understanding rather than formula, and description of current American financial practice, *Mathematics of Investment* is a fine intermediate-level text. Insofar as possible, standard actuarial notation is used. There appear to be some mathematical shortcomings as to exclusions and rigor, and a shortage of challenging problems. Nevertheless, the authors have conformed to their purpose in reaching out to the business administration student. In addition, their book offers an actuarial student a valuable, practical introduction to the mathematics of investment.

MARJORIE V. BUTCHER

E. M. Fisher and C. Rapkin, *The Mutual Mortgage Insurance Fund*, pp. xvi, 162, Columbia University Press, 1956.

The Mutual Mortgage Insurance Fund is the oldest and largest of the funds operated by the Federal Housing Administration. Established in 1934, it covers mortgages on one- to four-family dwellings and at the end of 1954 had outstanding insured balances estimated at $10,458,000,000. This book is a report on a study of the adequacy of the reserves held by the FHA in connection with the insurance of these mortgage loans.

The study was suggested by the President's Advisory Committee on Government Housing Policies and Programs and by the Committee on Organization of the Executive Branch of the Government (the Hoover Committee). It was made by the Institute for Urban Land Use and Housing Studies of Columbia University and was financed by the Life Insurance Association of America and certain organizations of mortgage lenders.

The report first describes the FHA operations and particularly the Mutual Mortgage Insurance System, citing the changes in the laws under which it operates and reviewing the experience of the System over the years. This is followed by a description of the FHA method of calculating required reserves. The System is participating, dividends being paid where warranted when mortgages are terminated, and a standard of required reserves is necessary as part of the dividend distribution procedure. Actual reserves accumulated from operations of the various dividend groups are compared against the required reserves.

The required reserve calculation is considerably different from that involved in life insurance reserves. The risk is one which decreases sharply with duration, and reserves calculated on a net premium basis would be negative. The most important characteristic of the risk is that it fluctuates violently with the economic cycle, and the reserve calculation makes the ultraconservative assumption that the economy is at the beginning of a depression at the time of each valuation. Heavy depression loss rates are assumed for the first five years after valuation, and then it is assumed that much lighter rates will obtain for ten years, with the cycle to revert again to depression at that time.

The calculation is thus on a gross premium reserve basis, and it involves loss rates under which the premiums are very inadequate. Therefore, it takes considerable time for the actual reserves accumulated, even though experience has been very favorable, to equal the required reserves. It was only at the end of 1954 that the actual reserves of the Mutual Mortgage Insurance Fund of $216 million first exceeded the required reserves, which were then estimated at $202 million.

The report examines the various factors—foreclosure rate, prepayment rate, rate of loss upon sale of property, etc.—which enter into the required reserve calculation, pointing out that very little experience is available which may be used to judge the appropriateness of the scales of factors used. Suggestions are made as to the possibility of modifying the factors, and the results of computations showing the effect upon required reserves of some modifications are shown. One assumption involved in the reserve calculation is questioned particularly. This is that the Fund must pay losses at time of foreclosure. Actually the Fund is not required to pay cash but instead issues to mortgagees 20-year debentures and thus is under no pressure to sell foreclosed properties at depressed prices. The question is raised as to whether the rates of loss should not take account of this feature of operation of the Fund and whether the amount of reserves required would not be appreciably decreased if this were done.

The general conclusion is reached that the reserves are adequate, that they are calculated in a generally sound manner and based upon conservative assumptions, perhaps overly conservative assumptions. The report concludes with a series of recommendations, one of which is that the premium for mortgage insurance, instead of being collected annually over the life of the mortgage, be partly prepaid, a procedure permitted by the statute. The annual premium is one-half of one percent of the outstanding balance of the mortgage, and the suggestion is that several annual premiums be required to be prepaid at the time the insurance commences. This would recognize the fact that the risk of loss is much heavier in the early years of the life of the mortgage than in the later years.

The author of this review served as actuarial consultant to the authors of the report and found the assignment a very interesting one. The report, however, is addressed to economists and that part of the public generally interested in mortgage insurance. It avoids any actuarial language except in one footnote. Mortgage insurance as carried on by the Mutual Mortgage Insurance Fund presents actuarial problems considerably different from those commonly dealt with by actuaries, and a study of the subject from an actuarial viewpoint would, no doubt, be of interest to many members of the Society.

George H. Davis

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—Accident and sickness insurance; 4—Social security; 5—Other topics.

References to allied subjects will be found in the following publications: *Mathemati-*

cal Reviews, published by the American Mathematical Society—Subjects: Theory of probability, mathematical statistics, mathematical economics, various other mathematical topics; *Monthly Labor Review*, published by Bureau of Labor Statistics—Subjects: Cost and standards of living, employment and employment services, fringe benefits, handicapped, industrial hygiene, industrial relations, labor organization and activities, manpower, older workers and the aged, personnel management, social security (general); *Population Index*, published by Office of Population Research, Princeton University, and Population Association of America—Subjects: Mortality, fertility, marriage, divorce, the family, various other demographic topics; *Social Security Bulletin*, published by Social Security Administration—Subjects: Retirement and old age, employment, maternal and child welfare, health and medical care, various other topics in social security; *Journal of the Institute of Actuaries*—The review section contains digests in English of articles appearing in foreign actuarial journals.

Life Insurance and Annuities

* C. M. Beardsley, *Life Company Annual Statement Preparation*, pp. 146, mimeographed, published by the author, Security Life and Trust Company, Winston-Salem, N.C., 1959.

In the introduction, the author indicates that the methods and statement treatment illustrated for the particular model company do not constitute an inflexible pattern but rather a guide to students and company officers in the completion of the "Convention" form of annual statement. The nature and size of the operation of the Model Life Insurance Company are set forth initially. The manual then describes briefly major records maintained for the purpose of completing the statement, with appropriate examples. In this connection, an organization pattern for the model company is assumed, with responsibility assigned to various departments for furnishing required information. For example, the Accounting Department furnishes the Trial Balance. As the manual was prepared primarily for the completion of the annual statement, the content of individual accounts is not discussed. It is assumed that the reader will recognize the nature of transactions included and be able to apply the principles to the Trial Balance of his own Company.

The manual proceeds to detail the preparation of the exhibits required in the first sixteen pages of the statement. Cross references between the various exhibits are provided in this section. The manual then indicates how many of the Exhibit items can be reconciled to Schedule content. Appendix A shows the completion of the first fourteen statement pages, using reference codes outlined in the manual to illustrate the source data for all items. Appendix B contains three exercises with detailed answers.

H. L. Seal, "A Statistical Review of the Evidence for the Existence of Temporary Selection," *Journal of the Institute of Actuaries*, vol. 85, pt. 2, September 1959.

The author presents a statistical analysis of every available published mortality experience of assured and annuitant lives from which the values of $q_{[x-t]+t}$ could be calculated for individual values of x and successive integral values of t. He has located and analyzed 38 such sets of mortality data covering mortality experience in over a dozen different countries. None of these 38 studies includes any experience subsequent to the year 1910.

On the basis of this analysis, the author states that it can be argued that temporary selection has never lasted for more than 3 years in any of the experiences in which it could be accurately tested. The author suggests that two analytical oversights responsible for the detection of the continuance of temporary selection for 5, 10, or even more years are concerned with grouping, in the one case of ages and in the other of durations.

G. Trier, "Mortality Investigation among Persons Whose Applications for Insurance Have Been Rejected," *Skandinavisk Aktuarietidskrift*, Parts 3–4, p. 204, 1957.

The mortality of 2,729 persons rejected by Norwegian life insurance companies during the years 1930–1946 is studied by age and sex from the date of rejection to December 31, 1952. Expected mortality is derived from select tables representing experience on standard lives, separately for each sex, during comparable calendar years. The data are also tabulated by primary impairment: hypertension, diseases of heart and vessels, cancer, chronic nephritis, and other diseases.

The mortality ratios for all ages and impairments are 326% for males with 576 deaths, and 266% for females with 123 deaths, and are greater for the younger than for the older age groups. The highest ratios are found among those rejected for cancer. An analysis by cause of death shows a high degree of correlation with the primary impairment for which the applicant was rejected.

J. Cornfield, et al., "Smoking and Lung Cancer: Recent Evidence and a Discussion of Some Questions," *Journal of the National Cancer Institute*, vol. 22, p. 173, January 1959.

This article covers practically all the more recent reports on the relationship of tobacco smoking to lung cancer as evidenced by a list of 85 references. These cover the years 1955–1959 (including some works yet to be published) and include references both pro and con in the controversy about the connection between smoking and lung cancer.

There are two phases to the arguments in this controversy. One is biological and relates to the effects of the carcinogenic agents which may be present in tobacco smoke and may also be present in polluted atmospheric conditions. All experiments with these agents have taken place with animals and some of the results are positive and some of them negative. The second argument is statistical; the validity of some of the statistics has been questioned on the grounds that the methods are wrong or that the samples are biased.

The authors of this review state that they have the following objectives:

a) to point out recorded facts that directly answer some of the criticisms, and
b) to define more precisely some inaccuracies of information with the hope that this will lead to further research.

The report divides the criticisms and answers into five major topics, as follows:

I Mortality and population data
II Retrospective and prospective studies
III Studies on pathogenesis
IV Other laboratory investigations
V Interpretation.

Under I it is pointed out that there has been a definite rise in the death rate from lung cancer, and that the references would seem to dispose of the suggestion that the rise is a spurious result of statistical classification. The report discusses such matters as the effect of aging on the lung cancer rate, the effect of better diagnosis, urban-rural differences, sex differences, other etiologic factors, and special population groups. In discussing the other etiologic factors, such as exposure to chromates and coal gas, the report points out that the population exposed to industrial carcinogens is small and that these agents cannot account for the increasing lung cancer risk in the remainder of the population.

Topic II raises the question of the complete accuracy of a retrospective study based upon patients with lung cancer, or based upon deaths from lung cancer. In general, the findings of the retrospective studies are confirmed by the more significant prospective studies covering a large group over a period of years. This section of the report further discusses the possibility of bias in the information, the possibility of inaccuracy in the information and the possibility that there are other factors besides smoking affecting the lung cancer rate. The report concludes that a further investigation of individuals engaged in some of the industries with a high lung cancer rate, such as manufacture of chromates, would be helpful.

Sections III and IV deal with the pathological aspects of the problem. One point made is that, while there apparently has been an increase in lung cancer among smokers, a comparable increase in cancer in other parts of the upper respiratory tract has not been found. There is apparently strong evidence that a carcinogenic agent can cause cancer in one part of the body and not affect any other part. The second point made is that other pollutants remain in contact with the bronchial epithelium for a longer period in smokers than in nonsmokers. It is possible that this might work the other way, that the air pollutants cause the original irritation and that this is aggravated by smoking.

The last section discusses three interpretations of the observed effects of lung cancer and cigarette smoking:

(1) The *causal* hypothesis that cigarette smoking causes lung cancer directly or indirectly.
(2) That lung cancer causes cigarette smoking, perhaps because a precancerous condition sets up a process which leads to a craving for tobacco. This possibility was advanced by Sir Ronald Fisher, apparently, says the report, "for the sake of logical completeness."
(3) The *constitutional* hypothesis that cigarette smoking and lung cancer both have a common cause which predisposes individuals to lung cancer and also makes them cigarette smokers.

Hypotheses (1) and (3) are discussed at some length by the authors, who favor the causal hypothesis.

The report also discusses the apparent multiple effects of tobacco since smokers have a higher death rate than nonsmokers from several causes. In the comparison of smokers versus nonsmokers, lung cancer as a cause of death is relatively much higher than any other cause. The authors suggest that each of the multiple effects might be studied separately.

The authors conclude their report as follows:

"One cannot discuss the mode of action of tobacco without becoming aware of the necessity of vastly expanded research in the field. The idea that the subject of tobacco and mortality is a closed one requiring no further study is not one we share. As in other fields of science new findings lead to new questions, and new experimental techniques will continue to cast further light on old ones. This does not imply that judgment must be suspended until all the evidence is in, or that there are hierarchies of evidence only some types of which are acceptable. The doctrine that one must never assess what has already been learned until the last possible piece of evidence would be a novel one for science.

"It would be desirable to have a set of findings on the subject of smoking and lung cancer so clear-cut and unequivocal that they were self-interpreting. The findings now available on tobacco, as in most other fields of science, particularly biologic science, do not meet this ideal. Nevertheless, if the findings had been made on a new agent, to which hundreds of millions of adults were not already addicted, and on one which did not support a large industry, skilled in the arts of mass persuasion, the evidence for the hazardous nature of the agent would be generally regarded as beyond dispute. In the light of all the evidence on tobacco, and after careful consideration of all the criticisms of this evidence that have been made, we find ourselves unable to agree with the proposition that cigarette smoking is a harmless habit with no important effects on health or longevity. The concern shown by medical and public health authorities with the increasing diffusion to ever younger groups of an agent that is a health hazard seems to us to be well founded."

Accident and Sickness Insurance

U.S. National Health Survey, *Hospitalization, Patients Discharged from Short-Stay Hospitals, United States, July 1957–June 1958*, pp. 40, Public Health Service, Washington, December 1958.

The number of patients discharged per thousand persons per year, days of hospital stay per thousand persons per year, and average length of stay are shown according to sex and age; corresponding data are presented for discharges excluding deliveries. Comparable data, but for broader age groupings, are presented separately for white and nonwhite persons and also for urban, rural nonfarm, and rural farm residents. Comparable data, without regard to sex, are shown according to family income and for four geographic regions. For marital status, discharge rates are presented according to sex and broad age categories. The average length of stay is also shown by sex and age for several types of hospital ownership (non-Federal government, nonprofit church, other nonprofit, proprietary, and all others). The distribution of length-of-stay intervals, with a residual of 31 or more days, is tabulated according to age and sex; this tabulation is made separately for numbers of patients and for hospital days. Discharge rates have been computed according to detailed hospitalized conditions, separately for surgically treated and not surgically treated cases, but without regard to age. The average length of stay is shown for a number of types of operations, separately for males and females, but not according to age. Discharge rates are presented according to sex and age separately for cases with surgery and without surgery, but without further detail as to condition or type of operation.

U.S. National Health Survey, *Acute Conditions, Incidence and Associated Disability, United States, July 1957–June 1958*, pp. 47, Public Health Service, Washington, December 1958.

Incidence rates for the acute conditions are presented by sex and age according to quarters of the calendar year and according to the specific acute condition. The annual number of days of restricted activity, of bed days of disability and of work days lost, each by sex and age, are also presented for specific conditions.

U.S. National Health Survey, *Selected Survey Topics, United States, July 1957–June 1958*, pp. 49, Public Health Service, Washington, November 1958.

The topics treated are disability, acute conditions, chronic conditions, persons injured, physicians' visits and dental visits. For all but chronic conditions, rates are presented according to sex and age.

U.S. National Health Survey, *Persons Injured, by Class of Accident, United States, July 1957–June 1958*, pp. 62, Public Health Service, Washington, February 1959.

The number of persons injured per thousand persons per year is shown according to sex and age for motor vehicle accidents, home accidents, accidents at work and a residual category. Corresponding rates are presented separately for bed disabling cases, but not with regard to class of accident. Also shown with regard to sex and age are rates of medically attended and of not medically attended injuries per hundred persons per year, each separated according to bed cases and others.

H. F. Dorn and S. J. Cutler, *Morbidity from Cancer in the United States*, pp. xiii, 207, Public Health Monograph No. 56, Public Health Service, Department of Health, Education, and Welfare, Washington, 1959.

The cancer data for this study were obtained from the records of every physician, hospital and clinic in ten heavily populated areas selected to represent the various geographic regions of the United States. To further the completeness of their study, the files of local vital statistics offices were searched for death records with a mention of cancer. This survey, conducted during 1947 and 1948, repeated a corresponding survey for the same areas in 1938. For reasons stated in the report, it is estimated that the composite morbidity rates for the areas surveyed may be from 10 to 15 percent above those for the United States as a whole. Throughout the report, the emphasis is on incidence rates, but prevalence and mortality rates are also cited. Part I is concerned with variations in incidence according to age, sex, race, marital status, and geographic region. Data are presented for specific sites of cancer, and special features are pointed out for some forms. Part II discusses trends in cancer morbidity, the relation to income, and the variations in the stage of the disease at diagnosis with age, sex, race, geographic area, socio-economic status, and primary site.

Group Hospitalization and Medical Insurance Plans in Canadian Manufacturing Industries, pp. 41, Economics and Research Branch, Department of Labour, Ottawa, December 1958.

Based on a survey of most manufacturing establishments in Canada with 15 or more employees, this special report deals with the prevalence of group plans in Canadian industry to protect employees and their dependents against expenses due to hospitalization, surgery and medical calls, either in the hospital, or at the doctor's office or at home. Statistics are presented to provide such information as the types of plans in effect, the extent to which the employer shares in the cost, whether participation in the plans is compulsory, and the number of employees covered.

Allowances for the Permanently and Totally Disabled: Medical Statistics (two bulletins), pp. 77 and 25, Research and Statistics Division, Department of National Health and Welfare, Ottawa, September and November 1958.

The first of these bulletins provides statistics for the fiscal year April 1, 1956 to March 31, 1957 on the extent and nature of the disabilities suffered by applicants for allowances under the Disabled Persons Act, 1954. This legislation provides financial aid to the Provinces for the provision of allowances of up to $55 monthly on a means test basis to persons age 18 and over who are permanently and totally disabled. The data are analyzed by age and sex in respect to applicants who were rejected as well as those who qualified for allowances. The second bulletin presents similar information for the fiscal year April 1, 1957 to March 31, 1958. However, as it deals only with preliminary data, the figures are not classified by age and sex, although more detailed information will be presented in a later bulletin that is now in course of preparation.

SOCIAL SECURITY

R. J. Myers, "Old-Age, Survivors, and Disability Insurance Provisions: Summary of Legislation, 1935–58," *Social Security Bulletin*, January 1959.

The principal feature of this article is a series of charts summarizing each of the major provisions of the OASDI system, tracing the changes from the initial 1935 legislation, through the various subsequent amendments, up to those made last year.

E. F. Wollenberg, "Vested Rights in Social-Security Benefits," *Oregon Law Review*, vol. 37, no. 4, p. 299, June 1958.

This article analyzes the Old-Age, Survivors, and Disability Insurance system from the viewpoint of a lawyer. Specifically, the legal right of individuals to benefits is examined under various circumstances—before eligibility for benefits, at the time of eligibility for benefits, and while on the benefit roll. The author points out that only statutory rights, subject by legislative action to liberalization or deliberalization (several instances of the latter are cited), are present and not contractual rights. Accordingly, although an insurance-type mechanism is present in the program, there is no contract of insurance within the traditional legal meaning of the term "insurance." Many instances are cited where benefit and coverage provisions have been changed under conditions that would not have been possible if contractual rights were involved. The author indicates that a broad social benefit program such as OASDI probably cannot, and certainly should not, be on a truly contractual basis.

Disability and Social Security, pp. 29, Social Security Administration, Washington, October 1958.

This booklet is the first public explanation of the methods of disability evaluation under the disability benefit provisions of the Old-Age, Survivors, and Disability Insurance program. The major portion of the booklet is devoted to medical and other factors that are considered in evaluating disability. Other portions of the booklet define what is meant by inability to engage in substantial gainful activity and describe the general nonmedical requirements such as insured status, filing of applications, vocational rehabilitation, and appeals.

D. G. Morrow and S. R. Dales, "Management of Selected Trust Funds," *Social Security Bulletin*, February 1959.

This article describes the legislative provisions in regard to the financing and investment aspects of Federal trust funds established with respect to social security, Federal employee benefits, and veterans' life insurance.

A. M. Skolnik and J. Zisman, "Growth in Employee-Benefit Plans," *Social Security Bulletin*, March 1959.

This article continues an annual series of reports into 1957 and revises some earlier data.[3] Except for pensions and deferred profit-sharing plans, estimates are limited to the years 1954, 1955, and 1957. Additional information from multiemployer plans also led to new estimates, as did revisions in the Securities and Exchange Commission reports on corporate trust fund plans. Contributions (employer and employee) for all

[3] See *TSA* X, 137.

types combined increased from \$6.9 billion in 1954 to \$9.9 billion in 1957, or by 44%. Benefit outlays were estimated to have increased from \$3.5 billion in 1954 to \$5.6 billion in 1957, or by 59%.

U.S. Department of Health, Education, and Welfare, Social Security Administraton, *Social Security Programs Throughout the World, 1958*, pp. xxv, 93, U.S. Government Printing Office, Washington, D.C., 1959.

This report—a revision of one originally prepared in 1949—gives in chart form the principal legislative provisions of the social security systems in 79 countries (including the Iron Curtain countries). Separate charts are shown for each of the following branches: old-age, invalidity, and survivors benefits; health and maternity benefits; unemployment benefits; family allowances; and work-injury benefits. In addition to the charts, there are 18 pages of text describing the general basis of the charts, including an analysis of the provisions generally applicable, and definitions and discussions of the various concepts involved.

International Social Security Association, *The Actuarial and Statistical Problems of Social Security*, vol. 1, pp. xxviii, 632; vol. 2, pp. xxviii, 481; vol. 3, pp. xxxii, 782, Éditions Internationales, Geneva-Rome, 1958.

This publication covers the proceedings of the First International Conference of Social Security Actuaries and Statisticians held in Brussels in October 1956. It contains the 62 papers presented (of which 18 are in English, with brief English summaries of the remaining ones), a general report on the papers prepared on each of the major subjects, and the opening and closing speeches of the meeting. The agenda consisted of three major subjects—Actuarial Problems of Sickness and Maternity Insurance, Statistical Sampling Methods, and General Orientation and Common Directives of Social Security Actuarial and Statistical Work—and one general item for papers on any subject.

Of the 18 papers in English, the following would be of most interest to American actuaries (titles somewhat abbreviated):

(1) Simple Method of Estimating Hospital Duration Tables
(2) Reduction Factors and Sickness Distribution by Duration
(3) Social Security Statistical Sampling Methods in Sweden
(4) Continuous Work History Sample Under OASI in the U.S.
(5) Sampling as Solution of Unusual Social Insurance Problems
(6) Sampling Techniques Used in Social Security in Great Britain
(7) International Comparison of Social Security Statistics
(8) Responsibility in Presenting Social Security Cost Estimates
(9) Unemployment Insurance Cost Estimating in the U.S.

G. S. King, *The Ministry of Pensions and National Insurance*, pp. 162, Oxford University Press, New York, 1958.

This book, primarily a detailed description of the organization of the Ministry and of the administration of the programs, is appropriately written by a former (1951–55) Permanent Secretary of the Ministry. During this period, the Ministries of Pensions (war injuries) and of National Insurance were amalgamated. In addition to the war pensions, and the programs under the National Insurance Act (unemployment, sickness, maternity, widows, and retirement benefits), the Ministry also administers the Family Allowance Act.

Administration of the programs is essentially a matter of the local offices, with the central office at Newcastle maintaining records. This makes for more costly administration, but expedites payments. The major administrative problem is in respect to retirement pensions—involving the contribution record (if deficient, the benefits will be reduced), the checking of the claimant's age to determine not only eligibility but number of increments for deferred retirement, the determination of actual retirement, and the reduction in pensions because of earnings. In considering the problem of decreasing the administrative costs, a partial experiment was made in 1953 through combining offices of the Ministry of Labour and National Service with those of the Ministry of Pensions and National Insurance. It was concluded that little, if any, economy resulted, and that management problems increased; the experiment was consequently abandoned.

Appendixes give the 1958 benefit rates for the various types covered by the National Insurance Act and for those under the Industrial Injuries scheme. The work of the actuary is touched upon briefly; his responsibility for annual reports and studies is noted.

Some of the statistics provided are:

(1) In the records branch at Newcastle there are about 30 million sheets of ledger accounts, separate accounts being kept for each insured contributor.

(2) In 1956, about 3¼ million families were drawing family allowances, of which about two-thirds received benefits with respect to one child, indicating 2 children of the prescribed ages; only 10% of the families had more than 3 children of such age. If benefits were to be paid with respect to the first child, the cost would be doubled.

(3) Sickness claims account for about 140,000 new cases per week, with the number on the rolls usually as high as 800,000. The influenza epidemic in 1957 showed new claims of over 500,000 for each of 3 successive weeks.

(4) At present, there are about 4½ million pensioners. The earnings test results in a reduction of only 40,000. The ratio to coverage (exclusive of pensioners) is slightly over 20%.

The concluding chapter brings out that private arrangements for sickness benefits and supplementary pensions are growing steadily, with the National Insurance scheme providing "the essential foundation."

"Cost of Non-Statutory Social Security Schemes," *International Labour Review*, vol. 78, No. 4, p. 388, October 1958.

This article gives somewhat fragmentary statistics of contributions and total receipts under nonstatutory (private) welfare and pension plans of eight selected countries. An attempt was made to relate these to corresponding data for statutory plans derived from another 1958 ILO publication, "The Cost of Social Security 1949–1954." Statistics as to private plans cover each of the six years during 1949–1954 for West Germany, Netherlands, Sweden, and Switzerland. For three countries, Australia, United Kingdom, and United States, most items relate to one year only, while for Canada they cover two years. Although contributions and total receipts are given primary consideration, benefit payments under certain types of plans are reported. No data on payments are given for the United States, and in most countries only payments under noninsured plans are reported.

A table gives two sets of ratios: (*a*) ratios of employee and employer contributions under private plans to employee and employer contributions toward the cost of statutory plans and (*b*) corresponding figures for total receipts. For Canada, Sweden, and the United States, such ratios of contributions were 56%, 53%, and 63%, respectively; for other countries, they varied from 6% to 41%. As used in the article, "total receipts" of private plans generally do not include investment income of *insured* plans; in Sweden and the United States, no investment income of any private plans is included. "Total receipts" as used for statutory plans include not only contributions and investment income but also government payments for public assistance, veterans' benefits, various forms of other government subsidy, and, in some countries, amounts listed as "public health services."

"Switzerland—Financial Aspects of Voluntary Insurance," *Bulletin of the International Social Security Association*, Geneva, December 1958.

This article shows that a voluntary system of social insurance can be very costly because of antiselection unless very strict safeguarding provisions are introduced. The experience is derived from the Swiss old-age insurance system, which is compulsory for the entire population living in the country but voluntary for Swiss citizens abroad. In the compulsory sector of the program, the ratio of pensioners to contributors is about 20%, while in the voluntary segment it is close to 90%. In the compulsory portion of the program, cumulative receipts in the first decade of operation have exceeded disbursements by close to 2½ billion francs, as would be expected in a growing program financed to a considerable extent like the OASDI system. Under the voluntary portion, on the other hand, there was actually a deficit of 25 million francs. The extent of antiselection is indicated by the facts that apparently only about 20% of those eligible for the voluntary insurance chose to participate and that the age distribution of the voluntary participants was relatively old—61% being aged 50 and over, as against 23% for the compulsory participation.

General Topics

George W. Barclay, *Techniques of Population Analysis*, pp. xiii, 311, John Wiley & Sons, Inc., New York, 1958.

This book, financed by the Population Council, was written to meet what was considered a need for an elementary text on demography which would cover basic principles of the subject on a worldwide basis and not be confined to North America or Western Europe. It is not designed for actuaries.