

**TRANSACTIONS OF SOCIETY OF ACTUARIES  
1960 VOL. 12 NO. 34**

**BOOK REVIEWS AND NOTICES\***

M. Spiegelman, *Ensuring Medical Care for the Aged*, pp. xxvi, 285 (second printing), published for the Pension Research Council by Richard D. Irwin, Inc., Homewood, Ill., 1960.

This volume is a monumental effort to compile virtually all statistical and other reference data available on many aspects of the economic and other problems related to the objective of providing the aged population of the nation with adequate medical care. The publishers' statement that "through prodigious research and painstaking scholarship the author has assembled . . . a veritable storehouse of up-to-date information on this critically important subject" is thoroughly justified in the opinion of this reviewer.

The principal subject matter of the volume is an aggregation of 80 statistical tables and other material gleaned from a mass of sources outside the insurance industry as cited in some 360 footnotes to the eight chapters of text. The first seven of these chapters serve mainly as commentary on the reference material and the eighth presents certain of the author's observations for prospects of meeting this need in the future.

Following an introductory Chapter 1, the author presents in Chapter 2 a summary of population and census data on persons over age 65. These data show clearly the rate of aging of the nation's population and the characteristics of the aged as to living arrangements and employment status. An analysis of economic condition relates both to income and to financial assets of those over 65. In the summary and conclusions to this chapter, the author notes the inadequacy of potentially valuable data on the "extended family" to provide an insight into the additional economic resource of aged persons living alone who have relatives living nearby.

At this point, the author highlights the desirability of considering separately the economic condition and needs of those just past age 65, who may still be productive and who are likely to have saved during recent years of prosperity, and the very old, whose opportunities for saving were impaired by the depression and who have been most affected by inflation. It is unfortunate that many of the author's sources of data compiled in later chapters fail to differentiate between those two distinct subdivisions of the over-65 population.

Chapter 3 summarizes available information as to the health status of persons over 65 compared with the younger population. The health attitudes and the opinions of the aged as to their own health and health care needs are also surveyed. Unfortunately much of the statistical information in this area is based on subjective opinions and personal recollections of the subjects, thus reducing its reliability. However, the information reported tends to indicate

\* 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*.

that financial problems may generally have been overstressed as a factor in the failure of many older persons to obtain adequate medical care in the areas of both prevention and treatment.

Chapter 4 covers medical care services available to the aged and the extent of their utilization by the aged. In this chapter, the author also points out that the objectives of medical care for the aged may differ from those of care for younger persons, since there is emphasis on alleviating the effects of disease (rather than curing disease) and on rehabilitation only to the point of ability to care for personal needs (rather than to employability) in many cases. Thus the need for improved nursing home and home nursing care, in addition to general hospital care, is greater for the aged.

The first 13 tables in this chapter supply very extensive data from several diverse sources as to the relative incidence and duration of hospitalization among older persons. While much of this material has previously been available widely, the parallel tabulation of comparative data for groups with differing characteristics highlights the undependability of data from any particular study as a basis for predicting results under varying conditions. The extremely high incidence of hospitalization under the Saskatchewan provincial hospital plan is duly reported; however, there are no data on the exact extent of the drastic increase in hospitalization rates in other Canadian provinces since the introduction of their government programs in 1958 and 1959. Because of a paucity of data, there are less extensive tabulations on frequency of surgery, other physician services, and dental services.

Chapter 5 is devoted to data on the extent of medical care expenditures of the aged, in terms of both the individual and national aggregates, and attitudes of the aged as to the financing of medical care. Statistics on the level of expenditures necessarily suffer from rapid obsolescence due to both the drastic inflationary trends in costs themselves and the recent spectacular increase in utilization of more complex and more expensive medical facilities. Since the latter may very likely have a substantially greater impact on the older than on the younger population, the absence of directly comparable data from similar surveys of similar groups in the early and late 1950's makes reliable projections to the future somewhat difficult.

The author might well have enhanced the usefulness of this chapter by venturing into the area of projections of comparable figures for, say, 1965. Such projections, of course, would have had to be based in part on his own subjective appraisal of the impact of many interrelated factors. However, the array of data and command of statistical techniques at his disposal would have enabled him to lend a greater authority and reliability to such projections than any which must necessarily be developed instead by his less sophisticated readers for their own use. Moreover, such projections would have stressed the impropriety of using any of the data in the tables without projection as being indicative of expected future costs.

Information on attitudes of the aged includes some indications of a noteworthy general awareness that adequate medical care is generally available to those

aged persons who cannot afford to pay its cost or who have no insurance. Also, a higher percentage of the aged oppose full coverage health insurance than of younger persons, although most consider some insurance coverage desirable.

Chapter 6 describes the various insurance, Blue Cross-Blue Shield, and independent plans that provide coverage of medical expenses on a risk-sharing or prepayment basis. With reference to insurance company coverage, particular attention is given to recent trends in underwriting practices designed to provide coverage in later years, such as inclusion of retired employees under group policies, conversion from group to individual coverage at retirement, guaranteed renewability of individual policies to advanced ages, and mass marketing of individual policies designed especially for sale to older persons. The discussion of Blue Cross-Blue Shield plans highlights the general availability of continuation of coverage after retirement.

Chapter 7 includes data from several sources which illustrate the substantial progress made in recent years in increasing the percentage of older persons who have some health insurance coverage. This percentage is notably higher among persons still in the labor force, those who have most recently attained age 65, and those with relatively higher incomes, but improvement has been noteworthy among others as well. Thus there is support to the insurance industry's contention that it is making definite progress toward insuring most of the nonindigent aged population.

Chapter 7 also includes a summary of various government programs for financing medical care for the aged, with particular reference to programs for the indigent and for military veterans. In this section, the author distinguishes between programs for relief cases and those for the "medically indigent" who require aid only for the financing of their medical care.

The author notes the tradition of local government responsibility for medical care of the indigent, the general applicability of means tests to applicants for such care, and the existence of great variations in practices by area. He next traces the history of changes in the level of benefits for basic living expenses under Old-Age Assistance from the original 1935 Social Security Act through the 1958 amendment to the Act. His description of the basis on which the federal government recognized payments for medical care in computing the matching share of total costs under the 1958 amendment gives valuable background for an understanding of the significance of the revisions in OAA subsequently adopted by Congress in September 1960 with Public Law 86-778. This law, cited as "Social Security Amendments of 1960," provides for an increase in federal grants toward additional state expenditures for medical benefits for OAA beneficiaries.

The author also notes the projected continuation of recent declines in the number and percentage of aged persons receiving benefits under OAA, which will tend to reduce the importance of this area of coverage, in contrast with coverage for nonrelief cases, in future years.

The most important development since publication of this book has, of course, been the amendment in Public Law 86-778 to provide for medical assist-

ance to those over age 65 not in receipt of OAA benefits who are unable to meet the costs of their own medical care. Under this Act, each state establishes its own program of benefits to help such persons meet part or all of the costs of a wide range of services. The federal government will assume 50% to 80% of the costs of the plan in any state, with the matching share based on the average per capita income in the state.

A projection of the potential demand for hospitalization among the huge and steadily aging population of veterans of the armed forces indicates that the amount of care provided by the federal government through the Veterans Administration will increase sixfold within the next 30 years.

In a brief section on income tax relief as a government mechanism for aiding the financing of medical care, the author cites the deductibility as a business expense of employer contributions to plans providing retired employee medical care benefits. However, the absence of a specific statutory authorization for tax deductibility of voluntary employer payments for advance funding of future post-retirement benefits for present active employees is perhaps of equal importance as a deterrent to sound financing of this need.

The important role played by various types of voluntary health agencies in providing health services to the aged is mentioned but is not demonstrated statistically, presumably because the diverse nature of these 20,000-odd organizations precludes compilation of reliable data in any detail.

Several pages are devoted to an interesting enumeration of the types of methods used in several dozen foreign countries for the financing of medical care for the aged. It is regrettable that the author did not expand this section to include commentary on the impact which overly "liberal" government programs are reported to have had in some nations on the quality of health care, its costs, and the economy generally.

The first seven chapters represent a background for the author's own views as to future prospects in this field in his final chapter. In this chapter, he discusses the concept of the individual's right to medical care, the significance of changing characteristics of the aged population expected in the future, and the supply of and demand for medical care. He expresses the opinion that any large-scale government-sponsored program for the aged introduced within a short period would produce an increased demand that cannot be met by the potential increase in the supply of trained professional personnel.

In considering possible paths for providing medical care for the aged in the future, the author notes that progress toward insuring a larger proportion of the aged population must also be accompanied by expansion in the scope and quality of benefits under voluntary health insurance, and that there will always remain a need for other provision for the medically indigent. On the subject of a national government health service, unsatisfactory experiences under the British program are cited from reports to illustrate its inadequacy so far as a solution to the problem of the aged is concerned.

A fairly extensive discussion of proposals for health insurance for beneficiaries of the federal OASDI program traces developments in this area of proposed leg-

islation to early 1960. The author sees the adoption of any such government program for most of the aged as an entering wedge toward eventual demands for a national health service. In reviewing various community attitudes among the public, he notes the advocacy of OASDI health care benefits by organized labor and social worker groups and opposition by medical, hospital, insurance and employer groups.

The author includes a thoughtful analysis of possible costs and operational problems in a government program. He also considers the possibility of serious disruptions that might be produced by a large-scale government program for the aged alone in the adequacy of medical facilities available to the remainder of the population. In connection with costs, he particularly cites the virtual absence of any data from which to project costs of such important items as nursing home benefits.

Since publication of the book, the 86th Congress has defeated the Forand Bill (H.R. 4700), which proposed health insurance benefits under OASDI, but the threat of such legislation remains ominously strong. The Democratic Party's 1960 Platform advocated the inclusion of health insurance coverage under OASDI, and the new Administration is thus committed politically to a strong effort in this direction.

Proposals by the previous Administration and those included in the Republican Party platform in 1960 specified that any program for the aged (other than those on OAA or eligible for medical assistance otherwise under Public Law 86-778) should be voluntary, optional, and contributory, should make use of private medical care, and should be sponsored and financed jointly by federal and state governments. That Administration also proposed gradation of premium and deductibles by income and permission for alternative purchase of private health insurance.

The author's purpose has been limited to collecting information and presenting it objectively, without making any insurance proposals of his own. Because of this approach, the book has some shortcomings for those who would argue against the threat of compulsory government health insurance for the aged. Thus, the author fully documents the definite advantages of the voluntary insurance method in meeting the needs of the aged, but he does not attempt to present a forceful conclusion. Although he refers to the question of the desirability of a governmental health insurance program as a matter of public policy, he prefers not to go into its important philosophical aspects, nor does he discuss the moral issues implicit in proposals for a public subsidy of medical care costs for a selected segment of the population which may include many who can provide adequately for their own needs.

For those who must carry on the crusade against such proposals, his text is an essential starting point and basic reference document, even though it would have been more effective if there were available information now sadly lacking on some phases of this problem. The book is definitely valuable to actuaries and any others interested in health insurance.

JOSEPH W. MORAN

D. McGill (editor), *All Lines Insurance*, pp. xiii, 202, Richard D. Irwin, Inc., Homewood, Illinois, April 1960.

"All lines insurance," a relatively new but significant development in certain quarters of the insurance industry, refers to multiple line insurance (*i.e.*, casualty and fire) plus life insurance. For many years "multiple line" had been a familiar term to designate a company or group of companies which issued more than one kind of casualty insurance—*e.g.*, automobile liability and burglary, but not including fire. In 1949, by amendment to the New York Insurance Law, the definition of multiple line was expanded to include fire insurance.

The book consists of 12 lectures delivered at the University of Pennsylvania by competent authorities, most of whom were in the casualty rather than the life insurance industry. The impact of all lines insurance is considered from a number of different aspects, such as administration and management, product development, losses and expenses, underwriting, marketing, education and training of both field and home office personnel, and investment policy.

Although two of the ten largest life insurance companies (Aetna and Travelers) have conducted "all lines" operations for many years, the current overtures for the formation of all lines combinations arise from the casualty side of the business. One important reason for this is that the largest life insurers (with the two exceptions previously mentioned) are mutuals and the New York Insurance Law prohibits a mutual life insurance company from owning the stock of another insurance company.

Some of the reasons advanced by the stock casualty companies for either acquiring an existing life insurance company or establishing a new one are: economy of operation (particularly through volume handling by means of electronic equipment), spreading the risk, opening new leads for the sales force, and competition resulting from all lines companies already established. There is however the danger, from the company's standpoint, that if a client has placed all his insurance with a single company and becomes dissatisfied with its service in connection with one line, he may cancel all the business and take it elsewhere.

Other obstacles in the path of wider development of all lines insurance, in addition to the insurance laws, are the differing practices between life and casualty companies in ratemaking and filing rates and forms with insurance departments, the relationship between first year and renewal commissions and vested interests in renewals, and the training of field men. The training of a life insurance consultant involving, for example, estate programming, key man business insurance, and similar specialized activities, represents a very substantial investment on the part of the company.

While there is some doubt that the comparatively recent impetus toward all lines insurance will spread on a large scale, the book covers an area of the subject that makes it well worth reading.

J. B. GARDINER

J. J. Carroll, *Alternative Methods of Financing Old-Age, Survivors, and Disability Insurance*, pp. xv, 187, Institute of Public Administration, University of Michigan, Ann Arbor, 1960.

This monograph, in the author's own introductory words, "is an attempt to determine the redistributive patterns implicit in alternate approaches to OASDI finance and to evaluate the economic effects which are likely under each approach." Three such approaches are considered:

1. A modified reserve program implemented by a gradually increasing rate schedule.
2. A hypothetical pay-as-you-go program financed by payroll taxation.
3. A hypothetical actuarial new-entrant rate system, financed initially by payroll taxes "at a rate sufficient to support costs for a group covered for a full working life," supplemented later "by a government contribution from general revenues when this level of payroll taxes plus interest becomes insufficient to meet benefit payments."

The first of these is, of course, the method now being applied, with a wide measure of acceptance, to OASDI. The second has had strong advocacy in this country but may be said to have been eclipsed by the first from the standpoint of actual practice. The third has also had some advocacy in this country. It has until now been used to fix contributions of employers and employees in British social insurance. However, the British are about to discard it as a means of determining contributions for retirement pensions.

By redistributive or "gain-loss" pattern the author means the pattern by income bracket (expenditure unit rather than family) of "net differences between total collections from and total benefits paid to members of each income bracket." The redistributive impact, it is pointed out, is determined by "public policy regarding benefit and financial arrangements for OASDI" and "is, in turn, an important determinant of the social burden imposed by the program."

By "social burden" we are to understand the decrease in national output, and therefore national income, or even the mere slowing of technological process, that may indirectly result from the method of financing the program. Such decrease or slowing may come about through the effect of the taxes imposed in either reducing effective demand and so causing unemployment, or in destroying incentive among the producing group.

The redistribution patterns developed serve the policymaker "as the basis for calculation of the output effects to be expected under each method of finance," which calculations are "affected by changes in saving, consumption and economic motivation resulting from income transfers." Redistribution patterns and the potential output effects associated with them "provide a basis for informed discussion of the problems of OASDI financing," even though these admit of no ready answer and "must remain a matter of individual judgment."

Under method 1 an analysis of 1956 data, adjusted to the 1958 increase of tax and benefit bases to \$4,800, supplies the gain-loss pattern on the basis of which the tax collections and benefit payments of future years, as estimated by the Division of the Actuary of the Social Security Administration, are distributed. The resulting projections measure "the redistributive effects which might be expected from current OASDI finance if the basic features (other than

population) of the (1956) economy were to continue"—such basic features as the pattern of consumption, stratification of the wage income of covered employees, and the relative income grouping of beneficiaries. Similar projections are made for the other two methods. In addition, there is needed and developed for method 3 an estimate of the gain-loss pattern by income bracket due to collection and disbursal of general revenues used for OASDI.

All these projections are to be viewed, not as predictions, but as "what would be true under a specified set of assumptions." Under identical assumptions, they "illustrate the fundamental differences and indicate the relative quantitative significance" of alternate plans of financing, thus providing insight into such significance. This sort of insight is needed in order that we may "have a rational basis for weighing the pros and cons of the total fiscal situation," and so not create through "inappropriate financial provisions . . . avoidable problems for those attempting to execute long-range programs."

In connection with the assumed constancy in time of the redistributive patterns of 1956, it is claimed that the relative redistribution between income brackets will remain stable, even though the absolute bracket amounts vary, provided "the benefit adequacy of OASDI is to be protected in the future (an assumption made in all the actuarial studies for the Social Security Administration)." If we may make this assumption, "shifts in absolute bracket levels over time become relatively unimportant," since "the same factors which will alter the absolute level of future transfers will increase payrolls, government budgets, consumption, etc."

The projections are not carried beyond the year 2020, though "the system will not mature before the middle of next century." This is of special significance under method 3, where the shift in burden towards the higher income brackets will continue beyond 2020, since the net gain-loss pattern due to collection and disbursal of general revenue used for OASDI would not be stabilized until after the midcentury.

As background for the redistributive projections, with their various economic implications, the first two chapters of the book discuss respectively the basic problems of compulsory social insurance and the history of the OASDI program, while the fifth chapter discusses the cost and revenue estimates developed by the Division of the Actuary.

In his final chapter the author, after noting that redistributive and output effects "form only one part of the total fiscal and budget problem," considers two other matters "which may modify the social burden of OASDI": (a) changes in other related programs and (b) the implicit revision of the allocation of the total tax burden involved in each financial proposal.

In dealing with (a) he avoids any direct estimates of the extent to which public assistance might be supplanted by OASDI in future years. This is accomplished through the device of "postulating the benefits which would have to be paid in 1959 if we were currently sustaining the dependency load anticipated for OASDI in the future." In this way he can utilize his previously developed methods "to compare the effects of alternate financing methods—



assuming the partial elimination of public assistance—in terms of current budget, income and tax burden data.” On this hypothesis he concludes that under any of the alternate financing arrangements, “not only would taxes go up to meet the payment needs, but additional anti-inflationary measures would be required to offset the increase in total consumption.” Then, generalizing for the future, he states: “for the economy which, in the absence of the program, would experience full-employment equilibrium, ‘integration’ of OASDI finance into the general fiscal picture of the future will involve curbing inflationary pressures. But these effects will be offset somewhat if public assistance is eliminated as OASDI grows.”

Regarding the reasonableness of an assumption that “federal grants-in-aid for old-age assistance are not necessary,” the author considers it “a matter which deserves much more study.” At the risk of some irrelevance this reviewer cannot resist the temptation to say that he not only concurs in this, but would go further and advocate a thorough overhaul of the assistances, not merely as programs in their own right, but in their relationships to OASDI.

Under (b) the author attempts a rough assessment of the future tax burden on the economy under the various financing methods. This assessment is made not only “in terms of current performance of the economy,” but also in respect of dependency loads anticipated for the years 1980 and 2000. On this basis he arrives at total additional tax needs under the respective financing methods, as follows (see Table 40):

Method of Financing	1980 Basis	2000 Basis
	(\$ billion)	
Current . . . . .	2.6	0
New-entrant Rate . . . . .	4.9	8.0
Pay-as-you-go . . . . .	5.7	8.8

In the light of these figures the author observes that “even after we recognize that periodic revision to higher wage bases will lessen the significance of interest payments, a strong case can be made that reserve accumulation is a desirable policy whose effect on taxable capacity will be in the proper direction.”

However, the author goes on to consider what could happen “if (as seems certain) continuation of the long-run tendency of wage levels to increase forces recurring adjustments,” thereby “lessening the effectiveness of the reserve fund.” With such an eventuality in prospect, “we must,” he tells us, “recognize that the pattern of pay-as-you-go financing may ultimately be the most relevant for our purpose.” But recalling that “the new entrant rate is in effect a pay-as-you-go plan,” differing from “our payroll tax supported plan only in sources of revenue,” the long-range planner of social security financing may find himself faced with a choice between these two pay-as-you-go approaches. In making such a choice an important consideration would be the changes in effective

federal tax rates by income bracket that would result from the difference in sources of revenue to the plan. Using his previous assumptions, the author tentatively estimates these changes as follows (see Table 42):

INDEX OF CHANGE IN EFFECTIVE TOTAL FEDERAL TAX RATES,  
BY INCOME BRACKET, UNDER VARIOUS FINANCING METHODS  
(1959 estimated rate = 100)

INCOME OF EXPENDITURE UNIT	METHOD OF FINANCING					
	Current		New-entrant Rate		Pay-as-you-go	
	1980	2000	1980	2000	1980	2000
Under \$4,000.....	106	101	107	110	112	119
\$ 4,000-4,999.....	107	101	107	110	114	121
5,000-7,499.....	105	100	107	110	111	116
7,500-9,999.....	102	100	105	109	105	108
10,000 and over...	100	99	105	109	102	103

Noting the regressive nature of the pure pay-as-you-go pattern as compared with that for the new-entrant rate, the author poses the issue for the long-range planner in these terms: "Do we care to revise the tax burden so drastically towards the lower end of the scale? Or will we reconsider, as the program matures, the original view that some of the costs should come from general revenues?"

The author finds his assessment of the future burden of the program in terms of current performance "reassuring" in showing that "the promises we have made are not . . . unrealistic in light of our productive capacity" but "slightly discomfiting" in that it "brings home sharply the costliness of the plan upon which we have embarked and underscores that we have not been carrying a tax load comparable to that we may have to carry later."

Such in sketchy outline is the ambitious task which the author has set himself and with which he very competently grapples. It clearly transcends his own modest characterization of it as "a survey of the possibilities . . . for the use of those who are prepared to undertake detailed study." The results show evidence of much painstaking research and serious reflection in an area where sound conclusions are often highly elusive and illusions can readily gain currency. It is no small tribute to the author to say that he has not only avoided the major pitfalls but also has made it easier for others to do so by making clearer the pathway around them. He would seem to have missed little that is really vital and significant to his thesis. He has read widely and deeply in all aspects of his subject, as evidenced by his references; and as he acknowledges in his preface, he has enjoyed highly competent guidance from administration and other sources.

The only limitation the author explicitly imposes on himself is to bar discussion of monetary aspects of his subject—*e.g.*, the possibility of open-market

operations and those that would attend borrowing (1) in an inflationary period, (2) in a period of depressed conditions.

By and large this book leaves your reviewer with the feeling that the problems of financing OASDI along with our other large commitments, though serious, are not insuperable. Many alternatives, often involving conflicting objectives, will be posed for future decision. The situation is highly complex, but with good will guided by intelligent research the right solutions should be forthcoming. And this perhaps is as it should be.

One reason, no doubt, for the treacherous nature of the OASDI terrain is the far-reaching and pervasive character of OASDI, which is an amalgam of social and political objectives, insurance principle, fiscal and budgetary policy, and economic theory. All these aspects must be simultaneously recognized and their claims given due weight if sound conclusions and practices based thereon are to emerge. Another closely related reason is that in none of these areas are conditions static. Thus, the financial situation changes continuously and dynamically, with transfers—fraught with social, political, fiscal and economic significance—occurring, not only between one income level and another (inter-bracket), but between one age group, or generation, and another (inter-generation).

Any modification in one phase of the system has repercussions throughout and perhaps even beyond it, repercussions that are not only spatial (so to denote pervasive change that is relatively simultaneous) but temporal. To illustrate: in connection with the government's contribution under method 3, the author observes "alternate methods of financing OASDI may in themselves alter the structure of the tax system of the future." Again, in making decisions on "the scale of protection to be afforded" and an "appropriate method by which to finance it," government must weigh carefully "the value of the political objectives in terms of the economic costs which may be involved." For "it is unquestionably true that ignorance of the economic impact of old-age security presents a serious threat to political stability." This is so because the costs of old-age pensions are deferred costs (liens on future production) and "if the alternatives are presented to the public in terms of costs of current benefit payments, unrealistic decisions may result."

Speaking of space and time, perhaps it is not altogether too fanciful to liken social insurance to a 4-dimensional world with an insurance, a fiscal, a socio-political and an economic dimension—though a world which still awaits the Einstein who will give it an organic coherence and consistency in all its dimensions, thereby furnishing the policymaker with a more comprehensive and potent working hypothesis on which to act. Meanwhile it is encouraging to find an author who appreciates the scope of the undertaking and can significantly move from one dimension to another in an attempt to reconnoiter the ground on which such a more effective working theory remains to be constructed.

In the absence of adequate training in economics and public finance, this reviewer must leave it to others to evaluate professionally the author's explorations in the fiscal and economic dimensions. Suffice it to say that he personally feels that the author's treatment of these aspects has appreciably furthered his

own understanding of social insurance. In the socio-political dimension, too, your reviewer can only state his belief that the author has been objective and impartial in his presentation of the implications for society and its shapers of the interbracket and intergeneration transfers with which his book is so largely concerned.

It is in the more scientifically amenable dimension of insurance technique, involving the major points of difference between social and private insurance, that your reviewer may perhaps be justified in assuming the role of a critic. And having made the attempt, he has emerged with a healthy respect for the author's competence in presenting the basic nature and the historical development of his theme and setting it in the context of its social, political and economic environment.

It is hardly possible in a limited review to list all the numerous problems broached by the author, many of which should concern the Advisory Council on Social Security Financing which is to be appointed next year and is required to report by the end of 1962 in anticipation of the scheduled 1963 increase in OASDI contributions. Your reviewer feels that, regardless of any shortcomings the economists or fiscal experts might uncover, or the extent to which they may disagree on the tentative or hypothetical conclusions of the author (one of whose aims is to stress the need for further research so as to make better projections possible), the book contains enough that is valuable and stimulating to make it "must" reading for all who want to keep abreast of social insurance thinking. In particular he would favor including it in the syllabus of the Society's examinations, either as an addition or as a replacement for some now dated items.

Of course, in so technically slanted a work there can hardly fail, at least in the first edition, to be some mechanical errors or inadequacies. The following may be noted:

*Page 123, Table 27*

Contribution and benefit figures in the first line are for the year 1959 (not 1957), and those in the last line are for the year 2000 (not 2020). See Table 29 for figures of both years.

*Page 126, Table 29*

Again, 1957 should be 1959.

*Page 134, Chart B*

Why no graduations along the axes?

*Page 137, 4th line from bottom*

Shouldn't \$10,000 be \$7,500, after which point the dotted line in Chart E begins to curve downward appreciably?

*Page 148, Table 35*

The last figure under "Decrease in Consumption" should be 50% (not 30%) of 864, *i.e.*, 432 instead of 259. Also, the \$ signs should be "\$ million."

*Page 149, Table 36, footnote*

"Table 27" should be "Table 35."

G. W. K. GRANGE

J. J. Finelli, "Installing Electronic Procedures—A Progress Report," *Journal of the Institute of Actuaries*, vol. 86, p. 161, 1960.

As long ago as 1948, the Metropolitan Life Insurance Company, not so identified in this timely and informative paper, commenced studying the feasibility of applying electronic equipment to insurance operations. At that time magnetic tape was in the laboratory stage. It was natural, therefore, that these early studies were based on a three card system as described in the September 1952 report of the Society of Actuaries. The first punch card file was to be for writing premium notices, the second for calculations, and the third file was a visual history record. The system was the first formulation of a consolidated functions plan for Ordinary insurance.

In mid-1954, a magnetic tape computer with appropriate auxiliary machine complement became available for business operations, the first insurance installation being in the Metropolitan. From mid-1954 to mid-1955 prove-out work done in the actuarial department, on limited applications, demonstrated that dollar economies could be achieved, and the tapes were suitable for record keeping. The present paper is a report on the uses and results subsequently attained with this equipment and later models during the first five years of operations, and some future projections.

There were three alternative approaches available to achieve the ultimate objective of mechanizing insurance operations:

1. Immediate development and testing of a full-blown consolidated functions plan. This was rejected because it involved too long a time without tangible results.
2. Successive development of separate functions, moving ever closer to a complete operating plan. This has become known as the function-by-function idea.
3. Application of electronics to a few narrow work areas within the current organization. This is an interim projects approach, and was initially adopted in order to train programmers and operators, to develop procedures, to establish basic tape files, and to organize an effective data processing center.

The accompanying table, summarizing results given in greater detail in the paper, shows the accomplishments to date on interim projects, and subsequently on stage setting projects, properly classifiable as function-by-function developments. The project weights are based on the absolute size of yearly net savings expected, while the percentages of former annual costs shown in the last column are an indication of the relative gains anticipated for each project, after the heavy planning and installation costs have been discharged during the development period. In making the comparison between electronic and earlier methods, equipment capital costs amortized over 10 years are included in the former. Due allowance was made for increases in the number of transactions based on a projection of 1958 conditions into the future. Included in electronic development are costs of training of personnel and research costs, but certain related costs of methods staffs in various operating departments were unknown and necessarily excluded.

While it is obvious that the figures cited are operating estimates, complicated by the shifting conditions of a transition period, the over-all results, even with allowance for skepticism, are very impressive. Indeed they indicate that no company with a substantial volume of transactions can afford to lag on electronic development.

Among these lessons, the paper points out the following:

1. The unfortunately high cost of development of home office payroll project, with weekly updating, was due to the relatively inadequate programming specifications and a premature start without a period of parallel operations.

2. The city mortgages project, covering billing and accounting functions on 350,000 mortgages, is the real show-piece as a successful operation. Low development costs were due to a happy combination of a skilled programmer with previous experience and a person who really knew his way in regard to mortgage servicing. The low operating cost is partly due to elimination of the former posted history card and to the introduction of an exception system of accounting.

PROJECTS	INSTALLATION COMPLETION DATE	PROJECT WEIGHT	MAN- YEARS TO DEVELOP	% OF ANNUAL COSTS BY FORMER METHODS REPRESENTED BY	
				Work De- velopment	Projected 1962 Operations
Interim:					
Home Office Payroll.....	June 1957	1.00	17	163%	31%
City Mortgages.....	Oct. 1956	1.36	1½	27	12
Agents' Registers.....	Feb. 1957	1.53	13	65	23
Stage Setting:					
Premium Notice Writing...	Oct. 1957	2.16	15	74	69
Dividend Calculation.....	May 1959	1.93	32	} Not stated	36
Dividends left with Com- pany.....	Dec. 1959	} 7.04	} 55		} 54
Premium, Dividend, Com- mission Accounting.....	Dec. 1960				

3. The agents' register project, involving the mechanical production by high-speed printer (600 lines/min.) of the life and lapse registers of 17,000 debit agents, was a straight translation to electronics of existing efficient procedures. It represents a "good return."

4. The premium notice writing project, involving 6,000,000 Ordinary policies, with an average of 3 notices each per year, incurred modest development costs, possibly because of the prior punch card system. However, the annual savings in operating costs were regarded as disappointing. This may demonstrate that too much copy work does not show up electronic equipment, as yet, at its optimum. Also, there appears to be doubt on the score of program efficiency.

5. The biggest single project attempted, with the greatest promise of dollar

savings, is premium, dividend and commission accounting. It is taking longer to install than expected. Punch cards are produced at the time of billing, but using different tapes from those for the previous project. These cards are sent to the district offices and returned with remittances after adjustment for changes. The project involved separate development and difficult coordination of internal machine and external operations. Extensive training was necessary of punch card operators and clerical staffs of the home and district offices. Furthermore, the magnetic tapes had to include information available initially only from the district offices.

6. The dividend calculation project, involving a third series of policy tapes, is a big project. It proved valuable for "data purification." One dividend actually paid (1956) was recalculated and checked. This proved to be the only control on correct year of issue. Potentially the file will be available for settlement calculations, for policy valuation, and such statistical uses as mortality studies. Hence the development costs cannot fairly be charged fully against the current project. Dividends left with the company are handled in a separate smaller project as a translation of a previous punch card system. It is most appropriately combined with the project previously mentioned.

The function-by-function approach, adopted for the stage-setting projects with separate Ordinary policy tape files, required separate servicing facilities for changes in each file. A single reporting system has now been devised as a first step toward consolidated functions. Gains were realized more quickly than if such an approach had been built up from scratch. In looking back, however, the author infers that the added development costs that were actually incurred, together with what remains to be done on consolidation, seem to be an excessive price compared with the direct approach. He does not make too clear the scope of future difficulties, so that one wonders how much they will be due to reprogramming on the machines, and how much to personnel problems. After all, it would appear that an efficient organization for consolidated functions might be quite different from what may currently exist.

The author describes the procedure development activities for the various projects. A Plan (*e.g.*, consolidated functions) is subdivided into Projects (*e.g.*, Ordinary issue). A Project is subdivided into Systems (*e.g.*, issue transaction reporting), which in turn comprise Jobs (*e.g.*, issue transaction tape preparation), and finally, Operations (*e.g.*, issue transaction district sorting). Various assigned teams, in the project development area, prepare charts and descriptions, and specify the input and output for each job. The coordination of the teams and the handling of their communication problems are major items of organization.

The next stage is labeled "Methods Development," which embraces programming. This starts with the input and output specifications at the job level, and results in the preparation of Operations charts. With currently developed generalized automatic programs, the programmer's function is to define the steps completely and accurately in machinable "language." Methods development embraces also the clerical operations and punch card operations ancillary to

electronic operations. The author recommends that all of these phases be centralized in the same team. This is said to be preferable to an internal and external team system because of the simplification of communication.

On the subject of development teams the author observes that a select approach (*e.g.*, with two persons working on city mortgages) yields better returns than a mass approach, as when they tried a team of 30 persons on premium, dividend, and commission accounting. A translation approach is one in which an existing procedure is carried over step by step into electronics, with deferment of the fundamental review which is necessary for most efficient operation.

The author devotes considerable space to comments on electronic machine equipment, some of the more important observations being as follows:

1. Productive use of the early model central computers, which resulted in the statistics cited earlier, amounted to 75% or 80% of total scheduled time. Break-in troubles with the modernized model are still being encountered, although the same ultimate productive usage is anticipated. The first year's operation of the original model brought to light engineering difficulties which have been improved.
2. The availability of a second machine was an important safeguard on five occasions where breakdowns exceeded 10 hours.
3. The major difficulty is in the tape transportation system. Computer misreads account for a large proportion of lost time. Automatic corrections, due to built-in controls, do not show in computer malfunction figures, although rerun corrections do. For this reason, the ratio of actual output per hour, on the high-speed printer, to theoretical output is a better measure of productivity of the system. This has varied from 73% to 89% for the various months from April 1958 to August 1959.
4. Metallic tape has proved very durable with less than 1% replaced to date. As the tape gets older there is an increase in computer misreads. This factor initially accounted for loss of less than 3% of scheduled time, but now accounts for nearly 6%. A tape cleaner has been purchased, although some of the problem may be due to greater density of packing of magnetized bits.

Any electronic installation must be concerned with the continuing problem of obsolescence. The question becomes one of economics as to whether to replace by newer models or to stick to a larger number of older and slower units. Some of the newer developments promise high-speed serial searching, up from 10,000 or 15,000 characters per second to 60,000 or even 100,000 characters. Another gain is in parallelism and overlapping of read-write-compute operations. There is also a trend towards modular unit construction, and solid-state components. Among other things, these new developments may, for the first time, make daily updating of large tape files economically feasible. One manufacturer is said to promise updating time of less than two hours for 1,000,000 policies of 250 characters each.

The significance of this, in respect to the consolidated functions approach, is that it may mean the elimination of all policy history cards in favor of periodic



status prints from the tape. It should be feasible to perform even rush servicing transactions in connection with the daily tape runs. Conceivably, the greatly increased volume of copy work entailed in daily updating, which presumably is not an economical application of electronics, will be offset by the large savings to be anticipated in discontinuing posted history cards. The comparatively infrequent requests for detail regarding prior years' transactions may become very costly to fulfill, but maybe when that day arrives life insurance companies like banks will introduce service charges for such items.

The author draws certain general conclusions from his company's experience:

1. Economies have greatly exceeded those possible with efficient organization and use of punch card machines. Electronic development and installation costs are not unreasonable, and represent a lower ratio to yield than for two large-scale punch card projects undertaken by his company.
2. The current outlook is for a 6-year recapture period on outlays for electronic development work and equipment combined.
3. Assuming complete replacement of machinery every 10 years and of tapes every 5 years, the sums invested in electronic development will yield a return equivalent to several times the interest rate on company investments.
4. The value of increased accuracy alone may well suffice to warrant use of magnetic tape equipment. Furthermore, controls are enhanced with the reduction of the possibility of omission or falsification of records.

When a company starts on the path of electronics it inevitably becomes committed to a "total systems concept." The result is a higher degree of dependence under consolidated functions on the performance of key people and machines. Jobs become more interesting with less drudgery.

It is impossible to review this excellent paper adequately in a shorter space than the author used himself, because of his closely-packed facts and his own synoptic style. Its careful study will repay anyone directly concerned with electronics. To quote the author, "Those who are now entering the field have the advantage of the lessons already learned by others as well as newer tools."

EDWARD H. WELLS

#### 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: *Mathematical 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.

#### ACTUARIAL MATHEMATICS, STATISTICS, AND GRADUATION

- H. C. Thacher, Jr. and W. E. Milne, "Interpolation in Several Variables," *Journal of the Society for Industrial and Applied Mathematics*, vol. 8, no. 1, p. 33, March 1960.  
 H. C. Thacher, Jr., "Derivation of Interpolation Formulas in Several Independent Variables," *Annals of the New York Academy of Sciences*, vol. 86, art. 3, p. 758, May 25, 1960.

Both these papers are concerned with finding a "polynomial" in  $n$  independent variables which assumes specified values at a number of specified points in  $n$ -space. The selection of base points is arbitrary; they need not be situated on a rectangular or other type of grid. The generalized polynomials indicated by the quotes are arbitrary linear combinations of a set of stipulated but arbitrary "basis functions." The number of basis functions is assumed to be the same as the number of base points. The vanishing of a certain determinant is then shown to be a necessary and sufficient condition for the existence of a unique interpolating polynomial, which is then given by a determinantal equation. A more compact formulation and greater insight into the nature of the interpolation process are achieved by the use of matrix notation.

In the paper first cited an iterative method (a generalization of Aitken's process) is given, by which the interpolation can be progressively extended to cover additional base points. This procedure is applicable only to interpolation by polynomials in the strict sense. The second paper generalizes the basic interpolation process so that the given data may include not only values to be assumed by the interpolatory function itself, but also by related functions obtained therefrom through the application of linear operators. A typical linear operator would be a partial derivative of specified order in the several variables.

- H. Freeman, *Finite Differences for Actuarial Students*, pp. vii, 228, published for the Institute of Actuaries at the Cambridge University Press, 1960.

This duplicates, with a few minor changes, the section on finite differences from volume 2 of the author's *Mathematics for Actuarial Students* published in 1940. Also included are 99 additional miscellaneous examples for solution, beyond those at the end of each chapter. Answers are given to the examples.

#### LIFE INSURANCE AND ANNUITIES

- Build and Blood Pressure Study, Volume II*, pp. 240, compiled and published by the Society of Actuaries, Chicago, Ill., March, 1960.

Volume II, which comprises 234 statistical tables and 6 pages of text briefly describing the tables, supplements the tables and text in Volume I.<sup>1</sup> Some of the tables in

<sup>1</sup> Reviewed in *TSA* XI, 1126.

Volume II show finer subdivisions of data presented in Volume I, while others supply data by duration or cause of death not presented in Volume I.

Whereas Volume I presents results based on combined standard and substandard experiences, weighted in the ratio of 4 to 1, Volume II shows the separate standard and substandard experiences. For example, Volume II presents detailed mortality data by age at issue and 10-pound weight groups for standard and substandard issues separately, and also includes actual deaths, expected deaths, and mortality ratios. With this detail it is possible to make various combinations of the experience by build or to combine the standard and substandard experiences in ratios other than the 4 to 1 ratio used in Volume I. Similar tables are shown for the experience according to systolic and diastolic blood pressures.

A table of mortality factors is provided to permit the approximate translation of the mortality ratios in Volumes I or II into the corresponding mortality rates actually experienced. These mortality factors can also be used to estimate excess deaths per 1,000 with respect to the Basic Table 1935-54, or with respect to standard male experience or standard female experience.

Volume II also contains a distribution of weights by height and age for standard issues and a distribution of systolic and diastolic blood pressures by age for standard issues. The corresponding distributions in Volume I were based on combined standard and substandard issues.

"Characteristics of 127,657 Welfare and Pension Benefit Plans," pp. 16 (mimeographed), U.S. Department of Labor, Bureau of Labor Standards, Division of Welfare and Pension Reports, May 1, 1960.

A single page of introductory text is followed by nine tables of data derived from plans for which descriptions were filed as of August 31, 1959, under the requirements of the Welfare and Pension Plans Disclosure Act effective January 1, 1959. The tables show distributions according to type of plan, state of address of principal office, month in which plan's fiscal or policy year ends, type of administrator, type of benefits provided, combination of benefits provided, parties making contributions, and industry divisions.

#### ACCIDENT AND SICKNESS INSURANCE

M. Lerner, *Hospital Use and Charges by Diagnostic Category—A Report on the Indiana Study of a Blue Cross Population in 1956*, pp. 32, Health Information Foundation, Research Series 13, New York, 1960.

The cost of hospital services in 1956 for some 843,000 subscribers in Indiana enrolled under one specific plan of the Blue Cross Hospital Service of Indiana is analyzed in this report. The tables included show the rate of hospital admission, average length of stay, hospital bill per day and per admission and average annual hospital bill for various categories of diagnostic conditions. The data are presented according to sex and age group and also for surgical cases alone.

U.S. National Health Survey, *The Hawaii Health Survey, Description and Selected Results, Oahu, Hawaii, October 1958-September 1959*, pp. 54, Public Health Service, Washington, May 1960.

Data are presented on the number of dental and physician visits per person per year, the distribution according to place of physician visits, the rate of hospital discharges, the average length of hospital stay, annual rate of incidence of acute condi-

tions, the number of chronic conditions per person per year, the number of persons injured per person exposed, and bed-disability days per person per year. In most instances, the rates are shown according to age and sex.

U.S. National Health Survey, *Acute Conditions, Incidence and Associated Disability, United States, July 1958-June 1959*, pp. 34, Public Health Service, Washington, June 1960.

This report presents incidence rates, annual number of days of restricted activity, of bed days of disability and of work days lost, each by sex and age, for specific acute conditions. It follows a report issued in December 1958 which presented similar information for the previous one-year period.

U.S. National Health Survey, *Peptic Ulcers Reported in Interviews, July 1957-June 1959*, pp. 26, Public Health Service, Washington, June 1960.

For this report, the peptic ulcers include all forms of gastric, duodenal, and gastrojejunal ulcers. The household interviews for the National Health Survey estimated a prevalence rate of persons with peptic ulcers amounting to 21.6 per 1,000 persons for males, 7.7 for females, and 14.5 for both sexes combined. Males had a peak rate of somewhat over 40 per 1,000 at ages 35-54, and females a peak of 17.5 per 1,000 at ages 45-54. No limitation of activity was reported by 85 percent of the persons with peptic ulcers. "Only 34 percent of the persons for whom a peptic ulcer was reported had consulted a physician about the ulcer within 12 months. The other 66 percent, who had not had a clinical recurrence, were apparently aware of the chronicity of the condition and so reported its presence."

U.S. National Health Survey, *Volume of Physician Visits, United States, July 1957-June 1959*, pp. 52, Public Health Service, Washington, August 1960.

The number of physician visits per person per year is shown, according to age and sex, with regard to residence (urban or rural), family income, education of family head, place of visit (office, home, telephone, other), type of service (diagnosis and treatment, prenatal and postnatal care, general checkup, immunization, all other) and each three-month interval within the survey period. Rates are also presented according to age, but not sex, for each of four regions of the country, separately for whites and nonwhites, with regard to both place of visit and area of residence, and also with regard to family income for both place of visit and type of service.

U.S. National Health Survey, *Arthritis and Rheumatism Reported in Interviews, United States, July 1957-June 1959*, pp. 26, Public Health Service, Washington, September 1960.

The report discusses the uncertainties that arise in the reporting of arthritis and rheumatism in household surveys and draws attention to the fact that, nevertheless, the findings from various surveys have been fairly consistent. The present survey yielded a prevalence rate of 63.9 cases of arthritis and rheumatism reported in interviews per 1,000 population. Almost one fifth of these cases were never medically attended and almost nine tenths did not involve bed-disability. No limitation of activity was experienced by three fourths of the cases and no limitation of mobility by nine tenths. On an annual average, there were 5.6 days of bed-disability per person with the condition. Corresponding data are presented according to age and sex.

U.S. National Health Survey, *Older Persons, Selected Health Characteristics, United States, July 1957-June 1959*, pp. 76, Public Health Service, Washington, September 1960.

For the most part, data are presented for detailed age groups for ages 45 and over. Using the definitions of the National Health Survey, disability prevalence data are shown, for both sexes combined, according to such characteristics as urban or rural residence, family income and major economic activity; these data are shown by sex according to family relationship. Further data relate to specific chronic conditions and specific acute conditions. The use of physician and dental services is set forth, according to age and sex, for urban and rural areas, and on the basis of family income and place of visit.

U.S. National Health Survey, *Diabetes Reported in Interviews, United States, July 1957-June 1959*, pp. 22, Public Health Service, Washington, September 1960.

According to this report, "Diabetes mellitus ranks . . . fifth among diseases usually regarded as chronic, exceeded only by diseases of the heart, cancer, vascular lesions of the central nervous system, and general arteriosclerosis, in that order." On the basis of this interview survey, the United States is estimated to have had 1½ million diabetics during the period of observation. The survey excludes diabetics among inmates of resident institutions. Local surveys which included clinical examinations yielded appreciably higher prevalence rates than the present survey. The prevalence rates per 1,000 population at ages 25-44 were 4.9 for males and 3.9 for females. The respective rates rose to 11.2 and 13.7 at ages 45-54, and further to 25.2 and 31.5 at ages 55-64. Practically all cases reported that they had been attended by a physician at some time and 92 percent were under care at the time of the interview.

U.S. National Health Survey, *Loss of Teeth, United States, July 1957-June 1958*, pp. 26, Public Health Service, Washington, September 1960.

The proportion of population who had lost all their teeth was 3.6 percent at ages 25-34; this increased to 9.6 percent at ages 35-44; to 22.4 percent at ages 45-54, and continued rising to 67.3 percent at ages 75 and over. At each age, the percentage for females was somewhat higher than for males. Rural areas had slightly higher proportions than urban areas. The proportions were also generally smaller in the higher income families and those where the family head had more schooling.

U.S. National Health Survey, *Acute Conditions, Geographic Distribution, United States, July 1958-June 1959*, pp. 30, Public Health Service, Washington, October 1960.

Except for injuries, the incidence of acute conditions was least in rural farm areas. On the whole, the incidence rate was highest in the West and lowest in the South. The West had particularly high rates for the respiratory conditions, digestive system conditions, and injuries. The rate for the infectious and parasitic diseases was especially high in the Northeast—almost twice that of the West and three times that of the North Central area.

#### SOCIAL SECURITY

Department of Health, Education, and Welfare, *Social Security Handbook*, pp. 261, U.S. Government Printing Office, Washington, 1960.

The first 15 pages of this *Handbook* summarize all of the programs contained in the Social Security Act, including public assistance, children's services, and unemployment

compensation. The remainder is devoted to a detailed explanation of the provisions of the Federal Old-Age, Survivors, and Disability Insurance program, based on the law and regulations in effect on January 1, 1960. This material covers the requirements to qualify for benefits, how application is made, and how the amount of benefits is computed, as well as a comprehensive description of employment and earnings covered under the program. An explanation of changes resulting from any amendments enacted in 1960 will be furnished to purchasers of the *Handbook*.

U.S. Congress, *The Retirement Test Under OASI, a Report and a Supplementary Report on a Study called for by the Committee on Ways and Means of the House of Representatives*, March 29, 1960, pp. 21, U.S. Government Printing Office, Washington, 1960.

This Committee Print of reports prepared by the Department of Health, Education, and Welfare describes the operation of the retirement test under the Old-Age and Survivors Insurance system under the present law, and the most important modifications which have been proposed recently. In particular, it reviews the justifications for a retirement test under a social insurance system, but it also lists the arguments which have been offered for its complete abolition or its liberalization. It has been suggested that to abolish the earnings limitation would be an incentive for many older people to contribute to the economic productivity of the country by continuing to work. On the other hand, such elimination would place an additional tax burden on the younger workers to pay pensions to older people who are still able to work and receive high earnings.

The report sets forth the number and categories of people who are affected by the retirement test. The supplementary report lists the various solutions offered to the problems. It also gives the latest cost estimates, ranging from a level-premium cost of 1% of payroll for complete abolition of the retirement test down to relatively lower costs for more moderate proposals.

The search is for a proposal of limited cost which would remove the inequities of the present law without adding the undesirable feature of paying substantial benefits to people with large, or even moderate, earned income. Several general bases for improving incentives to work are considered: (1) to increase the \$1,200 annual exempt amount, (2) to increase the \$80 "unit of excess earnings" that can result in the loss of one month's benefit, and (3) to reduce benefits in relation with earnings in excess of the exempt amount (such as \$1 for \$1; or 50¢ for \$1; or 50¢ for \$1 on the first \$1,200 of "excess earnings" and then \$1 for \$1—the last mentioned basis would have a level-premium cost of only .08% of payroll). This report comes to the positive conclusion that the retirement test should be maintained, and although certain modifications are worthy of consideration, none of them are specifically recommended by the Department of Health, Education, and Welfare.

G. M. Hougham, *Economic Security for the Aged in the United States and Canada*, A Summary, pp. ii, 82, Canadian Welfare Council, Ottawa, Ontario, October 1959.

The author summarizes the report with the same title by R. M. Clark which was reviewed in *TSA XI*, 293. The report, at that time in mimeograph form, has been printed and is available from The Queen's Printer and Controller of Stationery, Ottawa.

#### OTHER TOPICS

D. Weaver and B. G. N. Fowler, "The Assessment of Industrial Ordinary Shares," *Journal of the Institute of Actuaries*, vol. 86, p. 243, 1960.

The paper, which relates to common stocks of British industries, first discusses the various factors bearing on the profit-earning prospects of an industry. It then proceeds to the individual company being evaluated, going into the many questions that should be asked and the sources of information to determine the history and present state of the company. With regard to the balance sheet, particular attention is given to capital structure and the capital gearing (*i.e.*, leverage), liquidity and fixed assets. The profit and loss account is then considered with special reference to exceptional or nonrecurring items which must be adjusted to obtain valid conclusions, and measures of earnings on capital employed are developed. The importance of management is stressed, as is the need for the analyst to observe and evaluate changes in management when they are likely to be reflected in the policies of the company.

The paper then proceeds to the matter of estimates of future earnings, with emphasis on the use of all available facts, such as the statements of the senior officers of the company, and the need for reasoned judgments for missing items of information. The question of market-timing is considered, but the statement is made that it must remain largely a matter of judgment and experience. The authors do not claim that their procedures are new or completely objective. In fact, they stress that investment in equities is and must remain essentially subjective. They claim that the methods of analysis presented have two major attributes. First, they give considerable insight into a company; secondly, they introduce a discipline which minimizes, at times, the influence of too much current optimism or pessimism. Appendixes are included which give formulas for working sheets to carry out systematically the procedures discussed in the paper.

U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1957*, pp. xi, 789, Washington, D.C., 1960.

This volume contains 26 chapters of detailed historical data on specialized social, economic, and geographic topics. Among these are population, vital statistics and health and medical care, labor, prices and price indexes, national income and wealth, and consumer income and expenditures. The chapter on social statistics includes a section on social security and welfare, and the chapter on banking and finance has a section on private insurance.

Inter American Statistical Institute, *Bibliography of Statistical Textbooks and Other Teaching Material* (second edition), pp. xii, 120, Pan American Union, Washington, May 1960.

The references are listed in three sections, the first consisting of sources principally in English and the other two in Spanish and Portuguese respectively. The first two sections are each subdivided into 11 chapters according to field of application. Among these are chapters for actuarial science, social sciences and demography, medicine and hygiene, operations research, and general and mathematical statistics.