DIGEST OF DISCUSSION AT CONCURRENT SESSIONS

PERSONAL SECURITY IN THE 1970'S—
UNITED STATES AND CANADA

Changing attitudes toward personal security growing out of rapid economic
growth, inflation, technological developments, new patterns of education
and family life, and broader governmental welfare programs.

DR. GEORGE KATONA:* It is commonplace to state that we live in
an era of great and rapid change. During the last two decades there have
been substantial economic changes as well as great changes in technology,
in social conditions, and in people's attitudes.

Speaking of the economic changes first, we may ask the question, How
does the present American economy differ from that before World War
II? The following paragraphs outline some fundamental differences.

1. There has been a considerable improvement in the standard of living
of very broad groups of the population. When we speak of affluence, we
mean more for the many, not much for a few, which was the case in pros-
perous times of the past. The great majority of people are better off than
they were five or ten years ago.

2. There is practically full employment for those with skills and educa-
tion. Poverty still exists but is restricted to special groups disadvantaged
by age, race, or absence of male earner, but primarily by lack of skills
and education.

3. We have had a relatively high rate of economic growth, interrupted
by short and mild recessions only. A depression has become inconceivable.

4. There is inflation—a gradual but continuous upward movement in
prices.

5. Our economy is governed to a large extent by consumer wants and
aspirations rather than by consumer needs. Business investment is no
longer the only factor in the private economy which generates economic
trends. Two-thirds of total personal income accrues to the 50 per cent of
families with incomes of $6,000–$20,000. These families make discretion-
ary expenditures, especially on durable goods, that can be postponed or
carried out in advance of needs. Their expenditures depend not only on
ability to buy but also on willingness to buy. Therefore, psychological
factors influence people's economic behavior.

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6. The meaning of capital or wealth has changed. It does not consist any longer of business assets alone. Consumers' investment expenditures and assets in their homes are of the same magnitude as capital in business plants. Further, capital is no longer restricted to fixed assets. Human capital—people's skills and education—is of tremendous importance in our computer age, in what may be called a postindustrial economy or a knowledge society.

Underlying psychological changes have influenced these economic changes. My discussion is based on twenty years of surveys of consumer attitudes. Three major and enduring trends have been observed: optimism by the American people, rising levels of aspiration, and concern with both material goods and security.

Optimism has some structural causes. The peak lifetime income is received now at fairly late age levels because of the transition from blue-collar to white-collar and professional work. In addition, continuous income increases have generated optimistic income expectations. They are best revealed by recent comparative studies conducted in the United States and in western Europe. Both in the United States and in prosperous West Germany the majority of people say that they are financially better off than they were five years ago; yet 43 per cent of Americans and only 24 per cent of Germans expect to be better off in four years. The difference is still larger when the two measures are tabulated jointly: 34 per cent of Americans but only 12 per cent of Germans report that they are better off and also anticipate that they will be better off in the future.

Regarding income, standard of living, and (as I shall show later) savings and reserve funds, sights are raised as soon as a goal is achieved. Levels of aspiration rise with accomplishment and decline with failure or frustration. Saturation is not a function of the extent of possessions. Continuous gratification of wants has not reduced people's unsatisfied desires. This feature of a dynamic form of adaptation to change is much more pronounced in the United States than it is in western Europe.

American trends have often been criticized as representing thing-mindedness or gadget-mindedness. It has been said that we buy things we do not need with money we do not have. Yet the improvement of the standard of living of masses, as perceived by them, no doubt represents a beneficial development. Most importantly for the present discussion, recent studies have revealed that the American people are not only thing-minded but also *security-minded*.

People have two positive goals—to have a better standard of living and to have some, or larger, savings and reserve funds. They feel that the better off they are, the more they may lose. The prevailing large obligations

make it necessary to have reserve funds because the future is uncertain.

People want to spend and to save at the same time. The old statement by Keynes that saving is a negative act of not spending must be contradicted. The following findings indicate widespread interest in savings:

1. Expressed intentions to save are more common than the actual saving performance. Saving is highly valued.

2. The great majority of people are satisfied with their standard of living and with their incomes but not with the amount of their savings. Even people with substantial financial assets express dissatisfaction about them.

3. Studies of the use of income increments carried out following income increases, and shortly after the tax cut of 1964, indicate that greater resources are used primarily for two purposes—the purchase of durable goods and additions to savings.

4. Security has been enhanced through unemployment insurance and old age insurance as well as by private pension plans. But this added security has made for higher levels of aspiration. When a minimum basis for retirement is guaranteed, there is great incentive to engage in private saving in order to assure a comfortable life during retirement.

The American saving rate is relatively low, 6–7 per cent of disposable income per annum, as against, for instance, 12–14 per cent in Germany. But the difference, in additions to liquid financial assets, is much smaller, because the low American saving rate is partly due to debt incurrence which has continuously exceeded debt repayment.

Furthermore, what Americans spend on higher education should be considered as savings because it enhances human capital. The years of education among those in the labor force are much longer in the United States than anywhere else. Most Americans want their children to have a college education; in other prosperous countries the proportion with this desire is much smaller.

Educational aspirations reflect American dynamism, which consists of stepping up levels of aspiration: What is good enough today is no longer good enough tomorrow.

But our consumer economy does not represent an unmitigated blessing. There is a price to be paid for our dynamism. Let us enumerate the seamy side of growth and affluence.

1. While change is welcome, stability and predictability are still desired. These become increasingly impossible to attain and thus stress and tension increase.

2. When very many people have high aspirations, the danger increases that some of them will be disappointed or frustrated.

3. Consumer impatience to acquire goods today for which resources will only be available tomorrow contributes to inflation. Inflation is

viewed as bad, even by the majority of people who have had income increases exceeding price increases. Yet the majority of Americans say that inflation hurts them only a little. Recession, threat of layoff and unemployment, and our great social problems are viewed as the paramount problems of the day.

4. The poor and the disadvantaged are likewise impatient. They desire satisfactory living standards today and are not willing to wait for gradual improvement. The dissatisfaction and alienation of the poor are intensified by the growing affluence of others.

5. The decay of our environment is closely related to increased production and rising standards of living. The improvement in private goods has not been matched by a similar improvement in public goods. There is little willingness to pay the higher taxes that are required to pay for public goods.

The dependence of the economy on changes in consumer willingness to buy also results in occasional recessions. The 1970 recession was precipitated by a sharp deterioration of consumer attitudes (and was predicted by the Survey Research Center's Index of Consumer Sentiment, which indicated a decline as early as the spring of 1969). Consumer apprehension grew because of inflation, high interest rates, the threat of unemployment, and the war in Vietnam. Even though the recession will be a rather long one, it will be overcome because of relatively favorable trends in consumers' ability to buy and their underlying long-term optimism.

I am at the end of my discussion of findings about how the American people feel and think about their economic well-being. What remains to be done is to look at the future. The crystal ball is clouded, especially today, in the midst of a recession.

The American people want both progress and security. Both these goals must be and, I believe, will be achieved. Not completely and not satisfactorily, to be sure, but advances must and will be made toward a further improvement both in material well-being and in security.

A reordering of national priorities is required. It cannot be achieved by restricting supply and demand for consumer goods. The prospects of further betterment in people's standards of living must be maintained, because the perception of concrete and attainable rewards is what induces people to work hard. A redistribution of available resources is not a remedy.

The reordering of priorities can only come about by changes in people's perceptions and attitudes. What are seen as personal goals—the ego concerns—may be extended. There are indications that such an enlargement of the sphere of people's personal wants and aspirations has al-

ready begun. The dividing line between private and public goods is beginning to be blurred.

What we want for ourselves is no longer simply a better house, a better car, more fun. Personal desires extend to education and medical care, not only for ourselves and our families but for everybody. The public goods of better schools and better hospitals slowly become personal concerns. The same is true of fresh air and pure water. The pollution of the environment can only be fought by collective effort, not by private action. But the war against pollution is becoming a personal goal of many of us.

Poverty and violence in our immediate neighborhoods have become intolerable threats to our personal security. Thus our personal goals must extend to fighting poverty, to improving race relations, and to bettering inner-city conditions.

Security in the 1970's depends on a reordering of national priorities. We Americans have successfully tackled some of our economic problems. We have not yet faced with equal vigor our environmental and social problems. But we must and, I believe, we shall do so for the sake of our own security.[1]

DR. DONALD F. BELLAMY:* Dr. Katona has given a convincing statement on the affluence of North American society today. What he said about the United States applies with some modest variations to the Canadian scene. As was made clear, however, rising aspirations for more and better goods and services and the capacity to supply them have left casualties in their wake.

As an example, in passing, in a recent year (December, 1968—December, 1969), Canadian consumer credit in Canada reportedly rose from $7.7 billion to $8.7 billion. Among Toronto's 2 million people, an estimated 50,000 are in serious trouble on this account, despite government regulation over certain aspects of credit and buying, including a mandatory two-day cooling-off period in some types of transactions.

People living in poverty have occupied a great deal of time and space in the press, in official reports, and so forth, and little more needs to be said at this point. Heretofore, but perhaps no longer, the poor have been inarticulate, unorganized, and insecure, as well as widely distributed across the land. In relative terms, the lot of the poor—with reference to people receiving cash benefits from the government—is much better

than it was even a few years ago. The issue of whether welfare recipients and public housing tenants should or should not own television sets has almost been settled; some of our other values are also in the process of change.

I. SOME DIMENSIONS OF POVERTY

Although the statistics have limited meaning, we know from the *Fifth Annual Review* of the Economic Council of Canada that the income distribution in Canada has undergone only an indifferent change since 1951. The lowest fifth of the population gained in income from 6.1 per cent of the total in that year to 6.7 per cent in 1965. Incomes of the top fifth, however, declined from 41.1 per cent to 38.4 per cent.

If we take as a low-income family one which spends 70 per cent or more of its income on essentials (food, clothing, shelter)—a rather conservative measure—the resulting low-income poverty line places into the poverty group some 27 per cent of Canada's nonfarm population, or approximately 4.2 million people. The United States figure in 1965 was an estimated 34 million people, of whom only $7\frac{1}{2}$ million received income security benefits. Rising incomes subsequently lowered the proportion below the poverty line in Canada, to some 20 per cent, still a very large minority.

II. SOME PROBLEMS, ASPIRATIONS, AND RESULTS IN REGARD TO POVERTY

a) A mixture of compassion for the poor, self-interest, and ambivalence.— The provision of social assistance according to budgetary requirements (need) in Canada and the United States has highlighted the issue of benefits levels—how welfare benefits should be related to the wage scale in the labor force. In Canada, the fact is that at minimum wages (between 85 cents and $1.35 an hour across the country), pertaining largely to unorganized sectors of the economy, employment totally fails to raise the low-paid worker above the poverty line if he has to carry large family responsibilities. Increasing the minimum wage, on the other hand, merely causes the man to lose his job.

The result of departing from the old principle of "less eligibility," which has not yet occurred on any large scale in Canada, can be illustrated with reference to the Ontario program of Family Benefits. A worker supporting a wife and three small children on a total income of $5,000, including Family Allowances of $216 a year, will net an income of $4,021, or only $200 more than he would net if he received social assistance plus Family Allowances and premium-free hospital and medical care insurance. Moreover, as some jurisdictions, including Ontario, disregard a portion of earnings, it takes very little work for a welfare recipient to exceed the income of a fully employed, low-wage earner. The

opportunity is there, if they can give a convincing argument of un-employability, and low-wage earners will think twice before rejecting social assistance in order to take a low-paid job. Considering that there has been no mass migration to the welfare rolls, and only limited resentment about such a situation on the part of the working poor, it seems, perhaps, that our faith in human nature and positive motivation should be reinforced. The major shift in public attitudes underlying the policy should be stressed—a greater concern today than ever before about providing needed cash benefits even where they amount to more than wages.

This is not to say that there are no indications of ambivalence. There are, for example, work-activity projects in poor areas of Canada which have a rehabilitative-developmental function but are also capable of being used as an alternative to welfare in a punitive manner. There are coercive regulations designed to force people into jobs at the discretion of officials, which it may be claimed is not undesirable if the recipient can and "should" work; on the other hand, some of these income security measures have been designed with a protective function in mind—for example, the payment of mothers' benefits so that dependent children can be properly cared for at home. As for the United States, President Nixon's 1969 "workfare not welfare" proposals are clearly intended to strengthen the incentive to work but, in doing so, would offer inadequate federal family assistance program benefits that will need state supplementation.

b) *Erosion of purchasing power by inflation.*—The effect of inflation on social security measures has been and continues to be substantial. In the 1950's, the Canadian consumer price index increased by about 26 per cent, a factor that stimulated great pressure for higher old age security (demogrant) benefits; these were refused until near the end of the decade. By the time increases were legislated, and more than corrected the situation, they were too late to cut off a debate then raging about the development of a double-decker pension system. At the time, it seemed, higher demogrant pensions were an impossible aspiration, taking into account a host of other priorities, such as a growing health care program and education needs. The demands persisted, nonetheless, and in due course Canadians instituted a program costing a total contribution of some $800 million a year, which critics have said would have been better spent on increasing the demogrant, on which we now spend $1.5 billion.

One of the consequences of rising prices and standards of living in Canada, as was the case in European countries previously and is now the case in the United States, was the development of automatic adjustment indexes for the Canadian double-decker system, for which the

Swedish system supplied the model. The spiraling of costs and expectations but also the existence of resources to meet those costs now are pointing to the need for revision in the light of an 8+ point rise in consumer prices in the past two years. The upper limit of 2 per cent on pension indexing in old age security is causing the benefits to fall behind price increases and people are demanding a revaluation of benefits according to the full extent of cost-of-living increases or, better still, rising productivity.

Despite such shortcomings, there can be considerable inertia and resulting hardship when benefits are not related automatically to an index. For example, Ontario has only in recent weeks corrected a situation in which social assistance beneficiaries were receiving benefits on the basis of need according to budgetary calculations made in 1966.

c) The effects of income security on freedom of choice.—There are indications that the provision of a universal pension, the demogrant, in 1951 unleashed a complicated set of social forces that improved individual and family living circumstances and in turn brought demands for even higher pension benefits. Independence resulted from having a monthly check, leading to a measure of freedom from family and removal from crowded or otherwise inferior housing. The indications are that living arrangements of the elderly improved to a greater extent than they did for the average Canadian family. For the many with limited means, however—and this has contributed to persistent demands for improvements in pensions—a measure of independence has meant the dismal prospect of poverty in isolation rather than an opportunity to share fully in the mainstream of society.

d) A desire to make identifiable contributions for security.—Making contributions to social insurance in the United States and Canada seems almost a religion. Although, perhaps surprisingly, there have been no powerful social movements in Canada such as those in the United States, organized labor and the C.C.F.-N.D.P. party have maintained pressure. Unfortunately this desire to set aside money for retirement through a slow build-up of reserves has seriously conflicted with antipoverty objectives of income security programs for the elderly. Saving above and beyond the provisions of basic government income security programs became a powerful drive in Western countries by the 1950's.

e) A necessity and a desire to treat poverty.—Here I shall confine most of my remarks to the elderly because of the extent of measures against poverty in general and because there are some interesting results in policy development in regard to the aged.

The basic program for dealing with poverty of the aged in Canada was the 1951 demogrant, but, as I have indicated, it performed its func-

tion inadequately. The result was that pressure was generated to fill the income gap by means of a wage-related plan; this represented a shift from earlier conceptions (as in Europe) of the wage-related plan as a *supplementary* benefit plan. By contrast, from the outset the United States program (OASDI) had an antipoverty function and this continues. So far, the United States has apparently avoided moving into a double-decker program because OASDI predated the provision of a universal basic income for the elderly. Of course, having now raised the minimum benefit and blanketed in 72-year-olds (using general revenue subsidies), it is pertinent to ask whether it is feasible to separate this flat benefit component from the scheme or to leave the flat benefit where it is and develop a separate scheme anew similar to the Canadian demogrant. The antipoverty function of OASDI—income replacement—was unfortunately picked up for the Canadian program when it hardly applied; it became clear very early in setting policy that the Canada Pension Plan was not in a position to do much about poverty, nor would it be for a good many years. You may recall that failure on this score led to the development of yet a third program—the Guaranteed Income Supplement—an income-conditioned benefit, designed to close the needs-resources gap over the next ten years or so. I suspect that this is destined to become a permanent fixture in Canadian income security for the aged. A fourth layer of security should be noted for Canada's elderly, namely, social assistance supplementary aid to which the federal government subscribes 50 per cent of costs under the Canada Assistance Plan.

f) A strong desire to avoid means testing.—It is hardly necessary to relate that in both Canada and the United States administrative practices in welfare have left a deep imprint upon the minds of people, leading to demands to reject means testing. In Canada, parliamentary opposition to such a test produced some very stormy debates on old age pensions which eventually forced the minority government to look at other income security instruments in 1966, following which the Guaranteed Income Supplement was passed. The proportion of demogrant recipients receiving this benefit is now in excess of 50 per cent of the total, and some 60 per cent of these are in receipt of the full benefit on top of their demogrant. It appears to be effective, and the high degree of its acceptability suggests the validity of departing from a means test in favor of a declaration type of eligibility process. There are indications, however, that the number of elderly Canadians receiving cash supplements locally through social assistance will rise—to this extent defeating the goal of eliminating the means test entirely. This will arise partly from society's willingness to support benefits at a more adequate level and the continued failure of many people to set aside retirement reserves.

g) A desire to keep program costs down.—Financial considerations, however, have always inhibited proposals to supply above-subsistence benefits, as already indicated, and thus programs do a less-than-effective job across the board.

h) The trend toward centralization.—That there has been such a trend is clearly indicated by federal legislation in the field of old age pensions in the 1960's in Canada, together with provincial level social assistance in several provinces where public welfare was formerly a municipal responsibility. In the United States the Nixon proposal also envisages elimination of state-run AFDC programs and the development of a federal scheme (likely requiring state supplementation, as I suggested earlier). Technological and administrative developments and fiscal realities powered by reactions against local administrative abuses in some places have made the foregoing trend possible. The countervailing forces increasingly will be welfare rights and recipient groups, tenant associations, and so forth, which channel and cultivate grass roots sentiments and needs. In addition, Quebec's presence in Canadian Confederation is a countervailing force which seems to have no equivalent in the United States.

i) Some summary observations in regard to old age security measures.—The result of recent policy developments in Canada was an administratively clumsy, overlapping, four-part pension program. The various desires of Canadians led to the development of a four-part program which, despite its clumsiness and illogic, has received general approval from the public. The main criticism—and it may yet result in a downgrading of the federal Guaranteed Income Supplement as "just another means-test program" if corrective action is not taken—has been the demand to institute higher benefits in the face of erosion by inflation. It is interesting to speculate upon the apparent level of approbation in our respective countries in regard to paying for retirement benefits, considering the fact that the low- and middle-income worker accepts so readily a situation where he contributes very heavily to the retirement incomes of elderly people in a similar economic position to his own.

Unlike the United States program, the Canadian plan (the wage-related scheme) appears unlikely to depart from the initial concept of the scheme as one containing a substantial measure of equity, as opposed to increasing adequacy as in OASDI; the distinction is based on the existence of the contracting-out option taken by Quebec and the fact that federal-provincial negotiations are required to resolve differences surrounding changes of substance. Canada seems likely to look to another of its programs to supply adequate benefits to the elderly and possibly the private sector.

III. WHAT ISSUES CONTINUE TO PLAGUE US
IN OUR SEARCH FOR SECURITY?

1. Whatever happens in our efforts to moderate inflation, the experience of the last few years seems to have demonstrated the limitations of automatic adjustment procedures. Indexing of Canadian old age pension benefits was only partially effective, owing to an allowable increase limited to 2 per cent a year. The rise in the official consumer price index in the last five years has far outstripped the effect of indexing. Moreover, as standards of living of pensioners—and especially, perhaps, disabled and survivors, who may on the average receive benefits longer—fall behind living standards of the worker, pressure to improve the arrangement seems likely.

2. Overlapping income security coverage both in Canada and in the United States needs to be examined. Four cash benefit programs for elderly Canadians from two levels of government plus private pension plans suggest a very awkward arrangement. The remark applies to survivor and disability benefits which, because they are inadequate, require supplementation.

3. Our search for security has many sides to it. A healthy economy is a main pillar of personal security; this can be translated in labor market terms into manpower training and placement programs. Despite the views of some forecasters to the contrary, our policies and programs are predicated on a continuation of paid work in the foreseeable future. We read about relatively high payoff value of United States manpower programs under the Economic Opportunity Act; the collaboration of public-private enterprise in the JOBS program is important, and Canada is beginning a similar approach with subsidized on-the-job training.

4. The 1960's witnessed a multiplication of *major* programs in which public and private enterprise combined to accomplish social goals. Examples are student loan programs in both countries; medical care insurance in various jurisdictions; Ontario's legal aid financed by the province (plus client contributions) and administered by the law society; public housing development and administration. In the field of income security, rising costs and competing demands to cope with other societal problems suggest that public-private enterprise in social service will expand in the 1970's. Some of the questions to be answered are the following: To what extent has the private sector a social responsibility? What activity is appropriate and feasible? Amitai Etzioni's intriguing proposal recently that private insurance should offer government-subsidized poverty insurance through a consortium arrangement offers an illustration of quite different avenues of thought that could be opened up.

5. Currently, interest is focused on the debate over a negative income tax or guaranteed annual income approach to social security, some form of which has been endorsed by Canada's three main political parties. Enthusiasm, however, is decidedly mixed. What has come out of the discussions so far has been a variety of low benefit proposals with a pronounced attempt by the economists concerned to maintain work incentives among low-income recipients. We might do well to find out what the behavioral scientists can tell us about incentives from their research before we decide that this is as important as some claim.

Despite a greater efficiency in redistributing income to the poor, compared with other means, the administrative problems of a generally applicable negative income tax appear to be a major handicap to instituting such a program in the near future. Canada's operational form of NIT, the Guaranteed Income Supplement, may offer a usable model for special groups of the population, however.

6. Another certainty in the 1970's, I believe, is that the citizens who benefit from income security and other social programs—the consumers—will demand, and achieve, increasing opportunity to participate effectively in the decisions made about them. While it may be unnerving for us to hear their pounding on the door, there is room for optimism. The hopeful side to these developments is that the energy and talent might be channeled toward self-help and independence, which I consider ultimately achievable in an affluent democracy and in every sense fundamental to a sense of personal security.

MR. ROBERT J. MYERS: Last fall President Nixon proposed that automatic-adjustment provisions with respect to benefit amounts, the retirement test, and the maximum taxable earnings base should be added to the OASDI and HI programs. The House Ways and Means Committee did not adopt this proposal, turning it down by a straight party-line vote (all Democrats voting against, even though several of them had introduced bills with such a provision, and all Republicans voting for).

In the consideration on the floor of the House, however, this proposal was adopted by a vote of 233 to 144. What is indeed significant about this action is that it was taken over the strong opposition of Chairman Wilbur D. Mills, whose leadership is only rarely not followed by the House. Strangely enough, this legislative victory of the Nixon Administration was barely noted by the press.

The proposal now goes to the Senate for consideration.

ADJUSTED EARNINGS FOR LIFE COMPANIES

1. *a)* What is the present status of earnings-adjustment proposals of the American Institute of C.P.A.'s?
   b) Is it likely that a method developed to meet the requirements of the accounting profession will be appropriate also from the points of view of management, regulatory officials, policyowners, and shareholders?
2. Assuming that a suitable adjustment method would involve deferment of acquisition expense:
   a) Which expenses should be amortized?
   b) Over what period and by what method should they be amortized?
3. Assuming that a suitable adjustment method would involve a restatement of policy reserves:
   a) Should interest and mortality bases be consistent with experience assumptions underlying the gross premiums?
   b) If not, how and when should they be updated?
   c) Should expected withdrawals be taken into account?
   d) Should cash values constitute a "floor" for reserves?
4. Should the 818(c) reserve election be treated as tax deferral for the purpose of adjusted earnings?

CHAIRMAN STUART A. ROBERTSON: This subject is a timely one indeed. The measure of earnings derived from financial statements developed primarily for the purpose of determining solvency has long been recognized as an inadequate one. Company managers, actuaries, accountants, and financial analysts have all had an interest in finding ways to adjust statutory earnings to produce meaningful results. Right at this time, the accounting profession is developing, has nearly completed developing, a method that is designed to be universally accepted by members of that profession and, hopefully, widely accepted by others.

Our purpose today is to learn about the present status of their project and to give consideration to some of its actuarial aspects.

MR. ABRAHAM HAZELCORN: Before going into the question of the present status of earnings-adjustment proposals of the American Institute of C.P.A.'s, I would like to spend a moment on the purpose of financial statements. Approximately two months ago, the *Financial Executive's Handbook* was published by Dow-Jones Irwin, Incorporated. In it is a chapter by Mr. O. L. Luper entitled "Nature and Objectives of Financial Statements." Mr. Luper distinguishes in this chapter between special-purpose and general-purpose financial statements.

Under special-purpose financial reporting, he mentions those reports for regulatory agencies, the Internal Revenue Service, and other special groups. For general-purpose financial reporting, he speaks of investors, creditors, and the basic need of almost all groups. These people would like to know the financial status of a company and thereby have better economic alternatives for investing or other financial dealings; this does not necessarily mean within the same industry.

From this need arises the development of generally accepted accounting principles. I will mention several of them later when I get into the body of the program. The objectives of these generally accepted accounting principles, or GAAP, as accountants abbreviate them, are to get a fair presentation of the financial condition at a given time and to ascertain the result of the profit-seeking operations for a given recorded period.

With this introduction, I will turn to the first question. However, I will throw in a plug for the *Financial Executive's Handbook*, which is every bit as thick as, or somewhat thicker than, William L. Shirer's *The Rise and Fall of the Third Reich*. For those of us who find ourselves dealing with all types of industries, whether because of a holding company structure or simply in dealing with members of the board, I would recommend this recently published handbook. The contributing authors and consulting editors are from a wide variety of industries, and their treatment of diverse financial problems can give great insight to all of us.

At their last meeting the American Institute of C.P.A.'s (AICPA) Committee on Insurance Accounting and Auditing decided to continue its investigation of what has been called "natural reserves." A meeting of the AICPA subcommittee with Mr. Gary Corbett took place some time this week. It was also decided to form a subcommittee to review the applicability to mutual life insurance companies of adjusted earnings.

The AICPA has tried to resolve the question of proper earnings adjustments to be consistent with the generally accepted accounting principles which are to be applied to all industries. A good insight into their aspirations in this area can be gleaned from their response to the publishing of the Preliminary Report of the Association of Insurance and Financial Analysts.

To begin with, the letter of the AICPA Committee on Insurance Accounting and Auditing addressed to Mr. Theodore J. Newton, Jr., who was chairman of the Committee on Life Insurance Earnings Adjustments of the Association of Insurance and Financial Analysts, states that the expressed goal of the financial analysts is the adjustment of earnings as a tool for security analysis, while that of the AICPA is a guideline

to assist the practitioner in the determination of the financial condition and of the results of operations of a life insurance company on the basis of generally accepted accounting principles.

While these two goals may coincide, they can differ for many reasons. Thus the financial analysts felt that the limitations imposed by the unavailability of data put constraints on them to use certain reports and other data which may be published; the auditors do not have this constraint and would use the internal records available upon audit for compliance with generally accepted accounting principles. Therefore, some of their comments refer to conditions at individual companies which may differ from using a broad-brush approach based on the proposed adjustments of the Preliminary Report. I do not know whether we will have the time to go into what the financial analysts came up with, but, if we do, we will discuss that proposal too. After itemizing several points of difference or potential difference, the AICPA Committee ended its letter with the thought that the industry and actuarial groups would participate in the discussion of these problems. Here we have, hopefully, the concept of a consensus solution in regard to the audit guide report. Specific generally accepted accounting principles will be mentioned later on.

The committee is working intensively and hopes to release an exposure draft of the Audit Guide for Life Insurance Companies by the end of 1970. A meeting held the week beginning April 12 concentrated on this problem and invited as guests the LIAA-ALC counterpart committee and a committee of the Conference of Actuaries in Public Practice. One of the main items of such a guide, which would give permissive practices in various areas, would be that of adjusting earnings. Great interest has been shown in natural reserves, as already mentioned. A discussion of natural reserves will let us know a great deal about what the AICPA is now considering.

Is it likely that a method developed to meet the requirements of the accounting profession will be appropriate also from the points of view of management, regulatory officials, policyowners, and shareholders? No. I suppose I have completed that question with one word. I will stop being facetious, however, and assume that implied in the question is the additional word "why."

The basic posture of regulatory officials, which is primarily to assure solvency, will not be satisfied, in my opinion, with a method which will ultimately be a fair presentation primarily to shareholders of the financial status of a life insurance company. Having come from the New York Insurance Department, I have occasional business and social meetings with my former associates who are regulatory officials. While I detect a

greater appreciation of the need of adjusting earnings, I fully understand the position of these officials to stick by a conservatism which clearly and knowingly errs on the side of solvency. Even if various elements of conservatism are kept in the AICPA's final permissive methods, the degree of such conservatism would not be that desired by the regulatory officials. Also, the conservatism of the regulators would contradict the main purpose of restating earnings, namely, to give a fair presentation, according to generally accepted accounting principles, of those earnings. In this case, we have the GAAP of an element of conservatism based on a realizability test, whereas the regulators go well beyond with their conservatism.

Without going into the history of various attitudes, we can get involved in the semantics of the word "appropriate." Thus, as a chief executive officer of a mutual life insurance company, I may—and probably would—lean more toward the view of the regulatory officials in regard to information to my policyowners than I would if I were the chief executive officer of a stock life insurance company. It is possible, however, that management would like to avail itself of certain reports which it considers not appropriate for issuance to any of the other three groups mentioned, that is, regulatory officials, policyowners, and shareholders.

I would like, at this point, to stress that I am not an accountant, nor have I ever taken one hour of college courses in accounting. I somehow struggled through accounting portions of the actuarial exams. However, I have learned something about generally accepted accounting principles from my partners and other accountants with whom I have worked during my actuarial career. I, therefore, with this background, state the two accounting principles which should be mentioned in connection with question 2 and, by the way, with which I agree in regard to choosing and amortizing expenses.

a) The matching of income and expenses.—This concept is a broad umbrella under which we justify the very process of amortization, namely, if one incurs a very high initial expense in a given sale while that expense helps in the conduct of the business which brings in a level income (or premium), then it seems to make sense to reallocate somehow that actual expense and attribute part of it to later years.

b) There must be a clear prospect of realizability in order to amortize expenses.—Clearly, it would be the same thing as budgeting for a loss or going through some fantasy, if one were to expect to amortize certain expenses or to allocate them to a year so that they will be covered by certain premiums, when such premiums will not be around to do the job.

To question 2 itself, I would choose the large items of acquisition expenses, and I would also retain some conservatism by not finally seeking out every bit of expense which can be identified as acquisition. If we study Exhibit 1 and Exhibit 5 of the life companies doing business in very disparate ways, we would choose different items as significant acquisition expenses. Here, too, a knowledge of the individual company's operations is necessary to making a choice.

As stated above, the period over which acquisition expenses should be amortized has to be one over which it is reasonably expected that the source for such amortization will exist. Therefore, there has to be an association of the period with the expected or historical experience or persistency at a given company. The financial analysts have used Best's lapse calculation for this purpose. I would perhaps modify such a method with a proviso that, if a company is very young or if there seems to be a great variance in year-to-year experience, an added element of conservatism be introduced. By the same token, I would choose a period which somehow reduces the length of time which would come directly out of the mathematics of a study of expected persistency or of historical persistency of a company.

MR. DALE R. GUSTAFSON: There is a faint implication in Mr. Hazelcorn's introductory remarks (and at times the same implication has appeared less faint in other places) that generally accepted accounting principles should form the basis for general-purpose uses of financial statements with the recognition that there may be other bases of financial reporting for certain special purposes, such as reports for regulatory agencies, Internal Revenue Service, and other special groups. I would suggest that, when proper recognition is given to the basic interests of the various groups to whom life insurance companies report, it is statutory accounting that comes closer to suiting the general-purpose concept and GAAP that is for special purposes. If I may characterize those groups that are interested in life insurance companies as policyholders, prospective policyholders, investors, prospective investors, state regulatory authorities, federal regulatory authorities (including, most especially, Internal Revenue and the SEC), and, finally, management, I would, suggest that it is only the two groups of investors that have an interest in GAAP and that they probably should be interested in statutory reporting also. While I will not take the time to detail arguments here, I believe that it can be rather persuasively argued that the policyholders—both existing and prospective, both par and nonpar, both mutual and stock—should be interested principally in statutory or solvency reporting

and only secondarily, if at all, in GAAP. IRS has its own special-purpose accounting methods, which do not necessarily coincide with any other bases. Presumably, the SEC is interested in GAAP, but I am not sure that we really know how the interests of the SEC can be best served with regard to financial reporting for life insurance companies. Management is certainly interested in financial reporting beyond the statutory bases, but, to my knowledge, management has not felt a lack of proper information in the past and the addition of GAAP financials may or may not add useful information to that already obtained by management. Anyway, I am suggesting that general-purpose accounting for life insurance may well be statutory, with GAAP the special-purpose accounting.

I also have felt that some of the discussion of financial reporting for life insurance has tended to confuse the relationship between solvency accounting as represented by the statutory basis for life insurance and GAAP, in that comments are made to the effect that GAAP does retain some conservatism. I would suggest that if GAAP reporting contains any substantial degree of conservatism, it cannot be in accord with GAAP. By its very philosophical basis, statutory accounting contains a degree of conservatism that is irreconcilable with GAAP. This does not bother me, and I do not believe that it should bother you. These two different bases of accounting fill different purposes. The purposes are so different, in fact, that, if either method is forced to try to meet both purposes, it must necessarily fail in that effort.

For the purposes of these initial remarks, I will not separate the four subquestions under question 3. It seems rather clear at this time that a comprehensive actuarial understanding of adjusted earnings is being developed around a concept that is generally being referred to as the "natural reserve theory." This is a reference to the classic paper on the subject of natural reserves by Bruce Shepherd, published in Volume XLI of *TASA*. However, the concepts are not identical with the earlier paper, and there are some who think that a new term should be coined to identify this modern development. "Fully adjusted reserves" has been suggested, and I rather like it and for the purposes of this discussion will use that term, even though my personal opinion is that probably we will not have any success in stopping the use of the term "natural reserve theory."

In any event, by whatever name, under this approach reserves are calculated by use of the experience assumptions as to interest, mortality, expenses, lapses, and profits that were inherent in the gross premium scales. As has already been discussed, primarily for accounting principles

reasons the expense portion of this calculation is treated separately, even though it must be co-ordinated with and consistent with the other factors involved in restating policy reserves. If the actual experience over a period of time is exactly in accord with the experience assumptions, profits will emerge in exactly the fashion that they would have emerged in the asset share calculation that could have been made at the outset. As the actual experience differs from the assumptions, those differences will be reflected directly in the actual emergence of earnings. In this pristine, simplified, actuarial analysis of the problem that I have just given, the answers to the four subquestions are very simple: The first question is, Should interest and mortality bases be consistent with experience assumptions underlying the gross premiums? The answer is "Yes." The second question is, If not, how and when should they be updated? In light of the answer to the first question, the answer has to be "Never." The third question is, Should expected withdrawals be taken into account? The answer to this is simply "Yes." The fourth question is, Should cash values constitute a "floor" for reserves? Again the answer is simple; it is "No."

As soon as we leave theory, however, the practical questions associated with implementing the fully adjusted reserve method become many and difficult. How do we determine what the experience assumptions were that underlay the gross premiums?

Staff and records may be long gone, and even more likely premiums were actually calculated on a very simplified basis and true best-estimate assumptions were never associated with them. I do not, however, personally believe that these practical problems are going to prove insurmountable, in that I believe that suitable approximation methods and a general understanding of which approximation methods apply properly to which circumstances will quickly develop.

An example that seems already to be developing is that the aggregate sum of cash values may be a fair, rough approximation to use in certain circumstances, such as for the new small company and possibly even for some large established companies.

While I have not explicitly made the statement, it probably would be appropriate to state that my remarks thus far have been primarily in the frame of reference of nonparticipating insurance. Whether or not or in what way this concept is applicable to participating insurance is under intense scrutiny at the time this material is being prepared. It is true that there are significant theoretical, actuarial differences between the preparation of premiums and dividend scales for participating insurance and of premiums for nonparticipating insurance.

In regard to question 4, there are two aspects to the 818(c) reserve election in the frame of reference of adjusted earnings. First, it is and has been the position of both the life insurance industry tax experts and government officials both in the Treasury Department and in Congress that the 818(c) election was designed to provide an alternative method of taxation and thus does not constitute tax deferral in the accounting sense.

So far the accountants have been adamant in rejecting all this evidence and have indicated rather strongly that for their purposes the 818(c) election will be treated as a tax-deferral mechanism. This bad situation is made even worse by the fact that the Accounting Principles Board of the AICPA has ruled rather flatly that discounting of future liabilities is not permissible. While it is true that when this ruling was developed life insurance was not a part of the consideration, it is also true that the ruling was couched in very broad, inclusive terms. What this amounts to in the case of the 818(c) election is that a computation must be made as to what the current year's taxes would have been had the 818(c) election not been made and the full amount of the difference established as a liability for future taxes.

It can readily be seen that the accounting principle prohibiting discounting is at best uncomfortable when considered in the frame of reference of life insurance accounting in view of the fact that virtually the entire liability side of the balance sheet of a life insurance company is composed of discounted future liabilities. As a matter of fact, we discount both for interest and for probability. If we are able to get the AICPA to give some reconsideration to the propriety of discounting for interest and probability in life insurance accounting, the 818(c) election problem may be reduced to manageable proportions, even if we lose the argument on whether or not it constitutes an alternative method or deferral. For many companies when proper account is taken of the time and probability of payment of the current tax difference created by the 818(c) election, the amount of current dollars involved is very small indeed.

MR. HAZELCORN: We must go back to the discussion of natural reserves in deciding how to answer the four items under question 3. For the first question, the answer would be "Yes," that the interest and mortality bases would be consistent with the assumptions underlying gross premiums. This is the tack that the AICPA Committee seems to be taking. From the earlier discussion of the natural reserves, as that term is currently used, the very method accounts for such consistency.

The problem of updating is present even though the answer to question 3(a) is "Yes." At first glance, it would appear that there would be no updating if the experience assumptions of gross premiums are used. There could be a radical difference, however, in developing experience between those assumptions and reality. This has not been resolved, and there is a tendency to assume no adjustment; I cannot see, however, how the auditors could stand still for continuing something which is clearly and significantly different from reality.

If this is the case, how shall it be updated? Shall the updating be only for the future or retroactive? My guess is that, with an interest and mortality consistent with gross premiums, the updating in such a case would be only prospective.

Again, withdrawals would be taken into account by the very nature of the newly defined natural reserves.

I cannot speak for the ultimate resolution of the AICPA, but, in my opinion, cash values should not constitute a "floor" for reserves. In other words, while probability is applied for other events, I cannot see why it would not be the case for the probability of nonpayment of premium and choosing a cash value. This too could be answered in the negative, depending upon the very nature of the natural reserve method finally adopted.

With regard to question 4, as mentioned earlier, much depends upon the resolution of the AICPA in regard to the use of natural reserves. Once a position is decided upon, the tax question can be discussed.

The general position, however, seems to be that, if there is a permanent deferral or no "reversal," there is therefore no need to provide for deferred taxes. If, however, there is not a permanent deferral or if a "reversal" exists and it is simply a timing difference, there is a need to provide for deferred taxes. Phase 2 taxes as affected by an 818(c) reserve election are likened to depreciation choices in which there is always a "reversal" in theory.

It is true that *Opinion No. 11* of the Accounting Principles Board does not allow for a discount. The attitude is, and this applies to most other industries, that there is no recognition given to economic events. But, as Dale has said, this would be somewhat contradictory, in that the life insurance industry by its very nature takes recognition of economic events. We do, as a matter of fact, discount for both interest and probability; it would, therefore, be anomalous not to discount for interest in the case of such tax liability.

If we are dealing only with the Phase 1 tax, the whole question is immaterial. In the case of the Phase 2 tax, in which insurance operations

are involved, this question becomes significant. There is a further problem of what to do to a Phase 1 tax in a Phase 2 tax. How and when will this deferred credit be taken down?

Again, in reference to one of my earlier remarks, the resolution of the adjustment will hinge on how the audit guide is finally written. In addition, we have in any case a question of materiality. If, as Dale suggests, for many companies the tax created by 818(c) election will involve few dollars, then deferred taxes may not be set up, because they are not what the accountants deem material.

MR. MENO T. LAKE: In listening to the comments of the panel members regarding the amortization of acquisition expenses and the different approaches that can be taken in determining what expenses are to be amortized, I am struck by the degree of judgment that must be involved in these decisions. We should all recognize that the element of judgment is very great and that the resulting adjustment to a company's earnings is simply going to be an estimate, when it is all done.

In future discussions with the C.P.A.'s, I feel that we must bring home this fact very clearly. Since we are going to have to make estimates on a number of items, let us be sure that the guidelines that they eventually come up with emphasize practical application over theoretical accuracy.

Mr. Gustafson just referred to the fact that we might end up with a piece of this expense adjustment on the liability side and another piece on the asset side and that he feels this is not important since it is only the net result that counts. I certainly second his comments. Let us use, as an example, a company that has set up its new reserves on the Commissioner's Reserve Valuation Method. Let us further assume that it estimates the amount of acquisition expenses to be amortized at $10 million for a given year. The use of Commissioner's Reserve is, of course, designed to help amortize the acquisition costs, and they may, or may not, do the entire job. In this example, let us assume that they provided for deferment of $6 million out of the $10 million total. Then I feel very strongly that the company should be able simply to set up the remaining $4 million as a prepaid expense to be amortized over future years. I make this point because it is my understanding that the preliminary work being done by the accountants would not permit the company to set up a prepaid expense item for just that amount that has not been covered by the modified reserve basis.

It seems to me that any final rules that are adopted should be flexible enough to permit the most practical handling, provided that the net effect on earnings is still as true as our many estimates will permit it to

be. I do not think we should complicate matters by worrying too much about whether an item is on the liability or asset side, or both, when we are just trying to estimate the proper adjustment to earnings.

MR. GARY CORBETT: The current thinking of the AICPA Committee is that adjusted earnings should be based on reserves which do not anticipate profit margins but which do take into account all other factors which affect gross premiums. One method of accomplishing this full adjustment is to use natural reserves, calculated on the basis of realistic assumptions as to mortality, interest, withdrawals, miscellaneous benefits, and expenses. The proper treatment of dividends is still under consideration.

The natural reserve approach not only matches revenues with actual and anticipated costs and expenses but results in the deviations from anticipated costs and expenses being recognized in the accounting period in which such differences occur.

The natural reserve premium, calculated at the time of issue, is that premium which is a constant percentage of the gross premium and is the equivalent of all benefits and expenses expected over the life of the policy, taking into account anticipated interest, mortality, and withdrawals. There is no profit loading in the natural reserve premium. The natural reserve at any duration is equal to the present value of all expected benefits and expenses not yet incurred less the present value of expected natural reserve premiums not yet received.

All assumptions entering into the calculation of the natural reserve should be those used for the original gross premiums (the company's best estimate at the time the gross premium scale was set and not necessarily any arbitrary assumptions used in the actual gross premium formula), and these original premium assumptions should be used throughout the life of the business except where actual acquisition costs are less than assumed acquisition costs or where losses would not be recognized as soon as they are foreseen. This latter situation exists whenever the natural reserves are less than the gross premium reserves, calculated using the entire gross premium, and, for *all* assumptions, using a conservative estimate of future experience that is most accurate in the light of all that is known at the time the gross premium reserves are calculated.

If this situation should occur, the difference between the gross premium reserves and the natural reserve should be immediately set up, as an additional reserve, by a charge to earnings. For so long as this situation were to exist, the annual reserve charge would be the change in

gross premium reserves from year to year and natural reserves could be ignored. It should be emphasized that the comparison between gross premium and natural reserves should be made taking into account *all* assumptions. As a practical matter, gross premium valuations need be made only when the company has an adverse outlook with respect to an assumption that would materially affect the reserves. Examples of such situations would be a substantial increase in the level of annual expenses, a decrease in anticipated investment yields for in-force policies, increased withdrawals, and adverse mortality.

MR. JOHN C. FRASER: I would like to present the viewpoint of a mutual life insurance company with regard to the use of natural reserves for participating life insurance policies. I would like to make three points.

First, it is not clear what is meant by "the assumptions used to calculate gross premiums" in the case of participating life insurance policies issued during the entire period from 1907 to 1953, and it is quite evident that, had such premiums been based on experience assumptions, they would have been changing over this long time interval. In the case of a participating policy the dividend scales are used to make up any differences. Of course, it would be possible to develop natural reserves consistent with the premium level and initial dividend scale for any series of policies. Such an effort, however, would be extremely costly and time-consuming, and it is hard to see how mutual life insurance companies would find such an effort worthwhile.

Second, I recall from my studies when I was taking the actuarial examination that cash values are supposed to be based on natural reserves. Yet the panelists are saying that natural reserves should be based on the assumptions used in the calculation of the gross premiums and, at the same time, that cash values should not be taken into account. This seems to be an admission that, contrary to what we learned when we were taking the actuarial examinations, cash values are not based on natural reserves.

Third, as anyone who has dealt with the Internal Revenue Service knows, if you give them more than one set of figures, they will take the figures that produce the most revenue. It seems to me that there is a very grave risk in the development of another set of figures, particularly for Phase 2 companies.

What all of the foregoing adds up to is a strong plea that for participating policies the cash value be deemed to be the so-called natural reserve. For a participating policy, where the dividend scale may be changed as experience changes, it seems that the only firm and practical basis for natural reserves is the cash value.

MR. CHARLES L. TROWBRIDGE: For a mutual company the ad-justed-earnings problem is not so much a matter of getting along with the accountants as it is a question of keeping management informed on what is really going on.

We have found it worthwhile to recalculate reserves (for internal management information purposes only) on a basis closely akin to natural reserves, with future dividends according to our present dividend scale treated as an additional benefit. Under our dividend methods this reserve is also closely related to a retrospective asset share. In any par-ticular cell this reserve can be less than the cash-surrender value; it can indeed be negative.

These recalculated reserves give rise to what we like to think of as realistic surplus and realistic earnings. We have had fairly good results in this approach on the individual policy side, and there is little dif-ficulty in adapting it to group life or health. We have not solved all the problems arising in the group pension area.

MR. FREDERICK S. TOWNSEND: I would like to make a few simple pleas to the audience. First, I urge you to study the subject of adjusted earnings. Second, I urge you to contribute your opinions on the subject. Finally, I urge you to see that your company does not adopt any adjust-ment techniques which could be subject to criticism from either the accounting profession or the investment community.

The great danger is that the accounting profession may adopt a technique which is too complex to be understood or too inaccurate to be adopted by the investment community. Perhaps the present form of the convention statement is inadequate for investors, but we under-stand its shortcomings. Do not let the accounting firms force an adjusted-earnings technique upon your company which can produce unusual re-sults which could be discredited by the investment community.

When investors decide that the accounting practices of a given in-dustry are suspect, then the securities of that industry sell at depressed multiples. If you believe that life insurance stocks have fallen sharply since 1964, you have not seen anything yet. If we adopt a theoretical adjusted-earnings technique which is liberal, complex, inaccurate, im-practicable, or unreasonable, life insurance stocks will probably plunge to new lows as the money managers in the investment community with-draw capital from the life insurance industry. Why should we adopt faulty techniques which will value our shares at 8 times earnings when they deserve a 20 times multiple? Obviously, we should not.

For example, *Accounting Principles Board Opinion No. 11*, relating to deferred income taxes, was designed for all industries. However, when

it is applied to the property and casualty insurance industry, very poor accounting results come about. Deferred taxes are intermingled with statutory operating losses, capital gains, and changes in liquidation values. Earnings may increase when you have a catastrophic year and may decrease when you show a significant improvement in operations. The adoption of *APB No. 11* has already driven capital out of the insurance industry.

Stock market support for companies in any industry depends upon the predictability and credibility of earnings reported by the companies in that industry. The life insurance industry is fortunate in that the installment nature of the whole life contract creates a predictable trend of statutory earnings. The credibility of earnings is, however, in a state of collapse until such time as the life insurance industry finds a uniform, simple, and accurate method of computing adjusted earnings.

If such a technique is developed, then the life insurance industry will attract new investors. It will preserve the equity values not only of outside shareholders but also of key executives, home office employees, and company agents. If compensation is a key factor in attracting capable people into the life insurance industry, then the maintenance of a fair market for life insurance stocks through accurate financial reporting becomes a corporate responsibility.

Whether it is necessary to amortize expenses may depend upon what other types of adjustments are made. For example, if the increase in reserve (line 17 of the income account) were replaced by an increase in cash-value liabilities, perhaps no expense amortization would be necessary.

We are adjusting earnings because of the statutory loss incurred by writing new business. The corollary would be that, if a company wrote new business at a profit in the first year (and some companies do this), then no adjustment to earnings would be necessary. This implies that the existence of a first-year operating loss and not the existence of acquisition expenses is the reason (and perhaps the item) that should be adjusted.

Assuming, however, that one does amortize expenses, which expenses and over what period and by what method?

Direct acquisition expenses, determined on a conservative basis, should be used. If we try to reflect all acquisition expenses, to the nth degree, the approach may be too liberal and probably inaccurate. By using a conservative measure of acquisition expenses, we could avoid criticism and at the same time eliminate some expenses which might be nonrecoverable for certain companies.

Expenses should probably be amortized over a brief, uniform period of time without regard for a particular company's lapse experience. This would put all companies on a uniform basis for amortization. Uniformity is an important principle in adjusting earnings.

One of my personal objections to amortizing expenses is that the trend of earnings is distorted and difficult to recognize as a company goes from a poorly run operation to an efficient operation or vice versa. If the operation is improving, current improved operations are being charged with the loose expenditures of earlier years. If operations are deteriorating, current operations are credited with current expenditures and are charged only for the lower expense on which the company operated some years ago.

There are two major distortions in life insurance accounting. One is the first-year operating loss; the other is the incidence of the increase in policy reserves. Arguments are raised that a proper method of adjusting earnings must recognize (1) acquisition expenses, (2) reserve method, and (3) current rates of return on invested assets by restating reserves. What if all three of these objectives could be met by a single change in accounting technique or in the convention statement? Would not this change be worthy of consideration?

All three objectives might be met by discarding the increase in reserves and using the increase in cash-value liabilities. Cannot a cash-value liability be considered an accrued expense? If so, then why not charge the increase in cash-value liability against the income account?

I will agree that natural reserves look like the theoretical answer to adjusting earnings, but they are not the practical answer. For example, *TCR No. 174* outlines nineteen precise and exacting rules for computing natural reserves for adjusted earnings, then concludes with Rule 20, which states, "Companies should be encouraged to use methods of approximation and estimation in computing adjusted reserves."

If reserves are ultimately adjusted, I believe that cash values should constitute a floor for reserves. (However, I still believe that the increase in cash values should be used in place of an increase in restated reserves.) The reason for this is that cash values are demand liabilities, not contingent liabilities. One should not restate aggregate reserves below demand liabilities.

If the increase in reserves is replaced by the increase in cash-value liabilities, low early cash values might provide adequate loading margins in the first three policy years, or longer, to absorb initial acquisition costs of a reasonable magnitude. Therefore, the use of cash-value liabilities could do away with the need for capitalizing and amortizing acquisition

expenses and could be easily explained to the investment community. I believe that this approach would be acceptable to the money managers. I cannot say the same for *TCR No. 174*, as suggested by the accounting profession.

Tax liabilities which are deferred indefinitely should be relegated to the footnotes to the financial statements. *APB No. 11* failed to do this and forced unusual results upon the property and casualty industry. The market prices of companies exhibiting these peculiar results immediately dropped sharply in the stock market, while market values of their competitors' shares were still rising.

The life insurance industry would be foolish to report deferred income taxes which have little immediate prospects of being paid. This would understate earnings and hurt market prices. It would most severely affect the unsophisticated investor, while the sophisticated investor reads between the lines. Furthermore, it would suggest to the government that an additional source of health tax revenues is readily available.

PENSION FUNDING

1. Developments in the securities markets that affect funding:
   a) Have current price levels of common stocks and the high yields from bonds led to any slowdown in the trend toward equities?
   b) To what extent have pooled mortgage funds been utilized as a pension investment medium?
   c) Has "cash-flow" analysis been given any greater attention now that depressed market conditions appear to make liquidation of existing holdings undesirable?
   d) Have the pronounced changes in market value of equities and fixed-income investments caused a reassessment of asset-valuation techniques for pension-funding purposes?
2. IRS problems:
   a) What has been the effect of Revenue Ruling 69-255 establishing maximum levels of funding based on benefits accrued to date? Are alternative sets of actuarial assumptions a practical answer? What other approaches are being used?
   b) Is the IRS pursuing its intention to require minimum-interest assumptions related in some degree to actual experience? What techniques are employed to meet these requirements?
3. Trends in actuarial assumptions and methods:
   a) With increasing use of subsidized factors for early retirements and various optional settlements, what (if any) adjustments in actuarial assumptions are appropriate to ensure that plan liabilities are properly reflected? What methods are used to estimate the cost of such liberalizations as a basis for deciding whether to adopt them?
   b) Has it been possible to increase salary-scale factors to a realistic level without incurring IRS objections? To what extent are salary-scale factors used in connection with career-average benefit plans?
   c) Have any plans using level funding methods been changed to the unit credit method?
   d) How prevalent are dual valuations, that is, one for IRS purposes and another for internal or *APB Opinion No. 8* purposes?
4. Miscellaneous items:
   a) Where annuities purchased at nonparticipating rates are bought from insurance companies at retirement, is it appropriate to build these purchase-rate bases into the actuarial assumptions for valuing liabilities?
   b) Insurance companies are quoting split interest rates under long-term guarantee arrangements, reflecting the uncertainties of the interest picture far into the future. Has this technique been employed at all in pension valuations? Would it be if factors of this type were made readily available through computer programs?

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MR. SCHUYLER W. TOMPSON: As the result of a telephone survey that I conducted during the past week, I would say that the current low level of the market, notwithstanding the dramatic comeback in the middle of the week, has not discouraged those investment counselors who were previously convinced that pension funds should be invested in equities. The recent gyrations of the market are considered to be cyclical, and the long-term trend of the economy is still expected to be upward.

As you know, bonds currently are available which will yield 8–9 per cent, and some, such as New York Telephone Company, yield $9\frac{1}{2}$ per cent. It was this availability of high-yielding bonds that prompted one of our clients to liquidate his entire common stock holding and purchase bonds. Now this same client is busy buying up common stocks. My conclusion is that the large New York banks have not changed their investment philosophy because of the current low level in the market.

MR. CARL R. OHMAN: A year ago, when the current downturn in stock prices was getting under way, one of our large pension clients reacted by transferring all his funds from common stock to fixed-income investments. At the same time, a second large client transferred substantial funds in the opposite direction, to take advantage of what then appeared to be bargain prices in the stock market. Aside from these two offsetting events, we have seen little change among our clients in the long-term trend toward common stocks. Some clients have responded to the present stock market by temporarily holding current pension contributions, which would otherwise be going directly into common stocks, in a special separate account consisting of short-term, fixed-income securities. These funds will eventually be transferred to common stock separate accounts, and so this does not represent a long-term change in investment policy.

MR. TOMPSON: Several insurance companies, including John Hancock, have utilized pooled mortgage funds as a pension investment medium. Banks still seem to be reluctant, however, to engage in this type of investment, because the net yields on common stocks are still expected to exceed the net yields on mortgage investments, even though interest rates on mortgages have risen to 8 per cent in the East and to as high as $9\frac{1}{2}$ per cent in the West.

MR. BARRY L. SHEMIN: Since 1966, the John Hancock has operated a mortgage and real estate fund as part of its pooled separate investment

account for use by group pension contractholders. Currently, this fund has a market value of about $18 million, which is hardly an earth-shaking amount by pension fund standards. The fund has been growing at a rate of about 50 per cent per year over the last year or two, however, despite declining market values due to rising interest rates, and we expect it to show continued substantial growth in the future.

Most of the fund's portfolio covers multi-residential, -industrial, and -commercial properties. A small portion consists of loans on single-family residential properties, dating back to the early days of the fund's existence. I would not be surprised to see a trend toward mortgage and real estate investments, mostly at the expense of bond investments. In addition to government pressure, and perhaps even compulsion, this trend is encouraged by mortgage yields which are competitive with bond yields and by the opportunity for equity ownership and/or participation in the property's income, which provides inflation resistance without the vicissitudes of the stock market. For example, the mortgage and real estate investments of John Hancock's pooled fund had a yield to maturity of over $9\frac{1}{2}$ per cent as of the end of May, 1970, based on market value. This does not include potential returns based on properties' net income.

MR. TOMPSON: Some banks have been using a contingency reserve method to determine how much they can safely invest in common stocks. As I understand the method, a fund will invest in high-quality bonds to the extent that the income from these bonds is sufficient to provide for the expected payments to retirees of the fund over each of the next five years; then the remainder is invested in common stocks.

MR. D'ALTON S. RUDD: Some actuaries say that they have seen no activity in the area of asset write-up technique. Several clients that I have worked with have changed their write-up methods by changing the percentage; for example, one company, which was adjusting the book values of assets by 7 per cent of assets value less dividends actually paid, increased the 7 per cent factor to 8 per cent. The Pension Commission of Ontario is responsible for regulating solvency of pension plans. No rules have been prescribed for the valuation of liabilities and assets, but the current conditions of the markets for both equities and fixed-income investments are causing some changes in valuation techniques which are giving concern. Employers appear to be asking their consultants for weaker valuation bases, usually through higher interest assumptions. Sometimes the purpose is to create or enlarge a surplus in the plan to avoid

the necessity for current service contributions or indeed for a request for payout of the surplus due to the tight-money situations. In other cases, depressed market values on the asset side would cause a technical deficit to appear, and some rather unusual asset-valuation techniques to avoid this are being requested.

MR. JOHN HANSON: Regarding question 2, *a*, Revenue Ruling 69-255 is clearly directed against the aggregate method and the frozen initial liability method. The questions regarding what is a "practical answer" and what "other approaches" are being used seem to suggest that one might do almost anything rather than comply with the revenue ruling, and one might ask whether it is reasonable to deprive the actuary of the right to follow what he may consider to be "his method." In this regard some actuaries seem to be motivated by the belief that their purpose in life is to develop the highest possible level of pension funding. These actuaries may start out with entry age normal, often presenting results in such a way that the employer believes the accrued liability is equal to the value of accrued benefits, which it is not. Then, when the entry age normal accrued liability is fully funded, these actuaries are really fulfilled by shifting to the aggregate method and developing an even higher pension fund. There is a long-standing tax principle that no deduction is permitted if the plan is overfunded, and in Revenue Ruling 69-255 the overfunders are now finding their chickens coming home to roost.

I understand that some Internal Revenue Service offices are measuring overfunding for purposes of Revenue Ruling 69-255 using the unit credit method. I do not think that this was intended by the revenue ruling. That is, I do not believe the revenue ruling is intended to rule out the entry age normal accrued liability as a permissible fund level. I can understand, however, the confusion on the part of individuals working for Internal Revenue, since employers, accountants, and laymen generally think that the entry age normal accrued liability is the same as the value of accrued benefits.

The logical approach and the practical answer when the fund exceeds the entry age normal accrued liability are to recommend no contribution. The pension actuary whose sensibilities are offended by the need for this recommendation can conveniently place the entire onus on the Internal Revenue Service and Revenue Ruling 69-255.

MR. KIRAN N. DESAI: I am happy to hear that Revenue Ruling 69-255 is not intended for those claiming deductions under section 404(a)(1)(C) of IRC of 1954. The purpose of Revenue Ruling 69-255

is mainly to make it possible to apply the overfunding test for cases where the deduction is claimed under section 404(a)(1)(A)–(B) (and consequently no accrued liability is shown).

Tests for ordinary and necessary business expense to satisfy section 162 of the Internal Revenue Code are found in treasury regulations and revenue rulings prior to Revenue Ruling 69-255. All of them consistently permit the overfunding test on the basis of accrued liability per method used. We believe that Revenue Ruling 69-255 was not promulgated simply to reiterate or to counter this philosophy.

Revenue Ruling 69-255, for the first time, expressly permits the district director to request calculations of accrued liability to test overfunding, specifically where deductions are claimed under section 404(a)-(1)(A)–(B), and no accrued liability is reported on form 2950. This power was probably not clear under Treasury Regulation 1.404(a)-2(e); and section 1.404(a)-3(c) (coupled with Revenue Ruling 67-365) hindered an employer volunteering such information.

In practice, the Internal Revenue Service has been requesting tests on entry age normal cost funding method under Revenue Ruling 69-255. This confirms that Revenue Ruling 69-255 is not intended to limit accumulation of funds to unit credit accrued liability. The confusion seems to have originated because of a plethora of undefined terms we actuaries use, like "past-service cost," "past-service liability," and "accrued liability."

Curiously enough, we have had little trouble convincing the IRS up to this point. The problem, however, has been to show a clear-cut definition of accrued liability for various methods used.

Though the term "past-service cost" is clearly defined and some references are found for definition of "accrued liability" under entry age normal cost method, I was unable to discover a direct definition of "accrued liability" for level funding methods in general. The IRS was unwilling to accept the definition appearing in the Society's textbook or Mayerson's paper, both of which clearly define the term "accrued liability" as the excess of present value of benefits over present value of future normal costs. Also, it was not possible to convince the IRS that the terms "past-service cost" and "accrued liability" were synonymous.

In light of this, I have the following questions:

1. Has someone been able to convince the Internal Revenue Service of the definition of the term "accrued liability" through revenue rulings, treasury regulations, or some other means?
2. Has anybody been questioned on overfunding where the funding method was entry age normal cost method?

3. Has anybody been asked by the IRS to differentiate between the assumptions acceptable for deductions under Revenue Ruling 63-11 from those acceptable for testing overfunding under Revenue Ruling 69-255?
4. Has anyone obtained technical advice clearing the hurdle for level funding cost methods?

MR. HANSON: With respect to the four questions, I have the following comments. The regulations do define past-service cost as "the excess of present value of benefit over present value of future normal costs." As to the assumptions, I do not think the Internal Revenue Service has in mind application of a different set of assumptions for overfunding and deductions.

MR. DESAI: I would like to clarify my question. The term "past-service cost" is clearly defined in section 1.404(a)-6, but it is not defined as "accrued liability," and the tests for overfunding are outlined in terms of the words "accrued liability." The fact that the terms "accrued liability" and "past-service cost" are synonymous is clear to actuaries but is not that clear to laymen or IRS.

In other words, the question is whether or not the IRS agrees that past-service cost and accrued liability are interchangeable and that they agree that the terms are synonymous.

I believe that if frozen initial liability base is properly adjusted as outlined in Revenue Ruling 65-310, overfunding cannot result and the accrued liability cannot be unrealistic.

MR. HANSON: With regard to question 2, b, I am not aware that Internal Revenue is making a concerted effort to examine actual investment experience. The reasonableness of the over-all assumptions has sometimes been questioned, usually when the contribution is equal to the maximum deductible amount. An interest assumption of $2\frac{1}{2}$ or 3 per cent would probably not be acceptable, but I am not aware of Internal Revenue concentration on this particular assumption.

With regard to question 3, a, I believe that approximations are in order—both to estimate the cost of adopting subsidized early retirement benefits and to value such benefits after they are adopted. For example, the computed liabilities may be loaded based on estimates with respect to (a) the early retirement age, (b) the percentage of employees retiring early, and (c) the ratio of the benefits at the early age to the actuarially reduced benefits at the early age that would be payable if there were no subsidy. Alternatively, multiple retirement ages could be assumed, with the benefit payable projected precisely according to retirement age. This

is more complicated and may be more accurate, especially in the first year, but may not be more accurate in later years, as the incidence of actual retirement ages varies from the original assumption.

Subsidized options may be considered as a change in the normal form of benefits for those who elect options. Thus the computed liabilities may be adjusted on the basis of (*a*) the percentage expected to elect the option and (*b*) the increase in the value of the subsidized form over and above the normal form of benefits payable.

With regard to question 3, *b*, there is probably no agreement on what constitutes a "realistic" salary scale, and in this regard I believe the employer's view is of primary importance. The employer must balance the need for increased funding at any time against the obligation to maintain prices and dividends which are both fair and competitive. In a paper entitled "Precision in Pension Funding," published in the *1967 Proceedings of the Conference of Actuaries in Public Practice*, I wrote the following:

Another important factor under a final average compensation plan is the employer's view of whether or not current contributions should be adequate to fund projected benefits estimated under the assumption that compensation rates will increase as the result of inflation or productivity gains that are expected to occur in future calendar years, recognizing the hope that any common stock investments of the pension fund will appreciate in value during or after such years of general compensation increases.

If such compensation increases are not assumed, it will be seen below that accrued benefit security may be impaired by such general compensation increases; on the other hand, the cost of pensions based on such escalated compensation levels may be as proper a cost of fiscal periods after such general increases as is the increased compensation itself.

I disagree with the statements of some actuaries which appear to assert that inflationary salary increase assumptions are in all respects "realistic," especially when the assertions appear to reflect the view that salary increases occur only in the future. Consider a pension fund which exceeds the value of all benefits accrued at any time, where such accrued benefits are determined, without using a salary scale, based on prior service and compensation at that time. Under these conditions, salary increases of the past have been fully provided for, and the use of inflationary salary scales to develop contributions is not logical based on benefit security considerations. Such inflationary salary scales may or may not be necessary if the employer has elected a stable rather than an increasing incidence of contributions. "Precision in Pension Funding" demonstrates that contributions equal to normal cost and interest under the entry age

normal method will for virtually all work forces more than maintain the funding of the value of accrued benefits. The paper also examines the effect on benefit security of losses under the salary scale assumption.

I believe that salary scales are generally inappropriate under career average plans, since I see no reason why costs of a particular year should be based on future compensation levels under a career average plan. Those who counter with the argument that they see no reason why salary increases should not be considered reflect the Society literature and education and examination program which teach the use of actuarial methods in a vacuum rather than as tools of the actuary to achieve the objectives of the employer. "Precision in Pension Funding" develops the use of methods primarily to meet the employer's objectives with respect to "benefit security" and "incidence of contributions." The overfunding that will result by use of salary scales under career average plans will seldom be chosen by a knowledgeable employer in order to achieve a stable or decreasing incidence of contributions, although excessive contributions may be chosen for other reasons.

With regard to question 3, *c*, the selection of method in order to meet objectives with respect to benefit security and incidence of contribution logically will, and in practice often does, result in a change from a level funding method to the unit credit method when necessary to meet changing objectives.

With regard to the "dual valuations" referred to in question 3, *d*, I find that I disagree with the question, since all the necessary actuarial values can be obtained from what I consider to be one valuation. A valuation in a broad sense is, in my judgment, the processing of the employee data, and with the use of a computer it is possible to compute entry age normal, unit credit, and projected benefit values in one pass through the computer. The interrelation of these values may then be utilized to develop results consistent with the employer's objectives. This approach is summarized in "Precision in Pension Funding" as follows:

> For each actuarial valuation, more calculations are completed than those associated with any one of the traditional funding methods, and actuarial values from more than one of the traditional methods are often used and interpreted in combination.

It is obviously appropriate to develop and utilize figures under more than one of the traditional funding methods according to the purpose for which the results are to be utilized. The actuary who always uses the same method for all plans and, regardless of purpose, is in dire need of another arrow or two for his quiver

MR. OHMAN: There are several ways to recognize the added cost of using subsidized factors for early retirements. By far the simplest approach is to calculate the present value of benefits, assuming retirement at normal retirement date, and to multiply this liability by a factor equal to a weighted average over the various early retirement ages of the ratio of the present value of the subsidized benefits at each retirement age to the corresponding present value of actuarially reduced benefits, with the weighting based on an assumed incidence of early retirement ages.

A more accurate way to measure the cost of subsidized early retirement is to assume multiple retirement ages in the basic cost calculations, or to use one assumed retirement age selected to produce substantially the same effect on costs as the use of multiple retirement ages.

Our practice has been to use a salary scale whenever benefits are related to salary, whether career-average or final-pay, unless there is some good reason for not doing this. It is certainly true that inclusion of a salary scale is less critical for a career-average plan than for a final-pay plan. The effect can still be significant for a career-average plan, however, especially where benefits cross the break point under a step-rate benefit formula.

There are a number of pension cost situations where multiple cost calculations on different sets of actuarial assumptions may be of value, if not absolutely essential. Several such situations are described in the following paragraphs.

1. The client may wish to have two cost calculations, one using "realistic" assumptions as to interest, turnover, and salary scale and the other on more moderate assumptions. The first calculation gives the client a perspective as to the future incidence of costs if present conditions prevail, while the second may be used as the actual basis for current plan contributions with an eye to possible IRS requirements. Alternatively, the client might ask for one calculation on "high cost" assumptions, one on "low cost" assumptions, and a third on a set of "best" assumptions, which hopefully falls between the other two. The third calculation would be the basis for the client's current contribution, while the other two give him a measure of possible variations if future experience varies from the "best" assumptions.

2. *Accounting Principles Board Opinion No. 8* requires disclosure of the actuarially computed value of vested benefits under a plan if this exceeds the available plan assets. There are various interpretations of just what is meant by the actuarially computed value of vested benefits. One interpretation is to include the value of accrued benefits as of the valuation date for all persons who had satisfied the vesting requirements of the

plan at that time, including accrued benefits for persons then eligible for early retirement if early retirement is permitted without the employer's consent. This interpretation usually requires a separate calculation of the value of vested benefits, especially if the basic valuation uses the entry age normal cost funding method or some other projected benefit cost method. The two calculations may use the same assumptions as to interest and mortality but differ with respect to other assumptions, in that the value of vested benefits may also assume that persons eligible for early retirement will retire immediately.

3. There are situations where the client may require two calculations, one using a projected benefit funding method for determining the client's current pension contribution and the other valuing benefits accrued to date to measure the current adequacy of funding under the plan. We have already discussed the possibility of such an alternative calculation being required to establish maximum levels of funding under Revenue Ruling 69-255. Such a calculation might also be required where a client is funding a final-pay plan by using a projected cost funding method but needs assurance each year that the plan assets at the time are sufficient to cover all benefits accrued to date in the event of plan termination. This can be of particular importance where the client is a partnership and plan termination on the death of a partner is a real possibility.

4. Another situation where dual cost calculations may be of value is where a unit benefit plan funded through deferred annuities with periodic updating of past-service benefits to reflect increases in cost of living is to be replaced by a final-pay plan. It may be desirable here to calculate the new plan costs on two bases, one using a realistic salary-scale assumption to give the client a realistic picture of what the new plan will actually cost and the other using a more modest salary scale or no salary scale, to provide a more meaningful comparison of the relative levels of current contributions under old and new plans. This would also be useful where the old plan is funded through an individual policy trust.

Where annuities are purchased at nonparticipating rates from an insurance company at retirement, it seems reasonable to exclude the retired lives from the actuarial valuation, since there will be no actuarial gains or losses flowing back into the plan from experience after retirement. The liabilities for active lives can be calculated by using an assumption as to what the nonparticipating rates will be under the contract at the time of retirement. The insurance contract will specify a scale of rates; however, the rates may be subject to change by the insurance company with respect to future retirements. The rates used by the actuary in

valuing liabilities for future retirements should therefore be modified, as appropriate, to allow for possible future rate changes.

Split interest rates could be used in pension valuations for two different reasons: (a) to reflect the uncertainties of the interest picture in the far future or (b) to reflect anticipated changes in investment policy for the plan assets which may be expected to produce different patterns of investment yield in the future. The first would suggest the use of lower future rates, while the second might suggest the use of higher rates for certain future generations of funds and for the corresponding plan liabilities.

We have actually used split interest rates in some pension-cost calculations where their use seemed warranted. I still have reservations as to whether their advantages are sufficient to make the additional effort worthwhile.
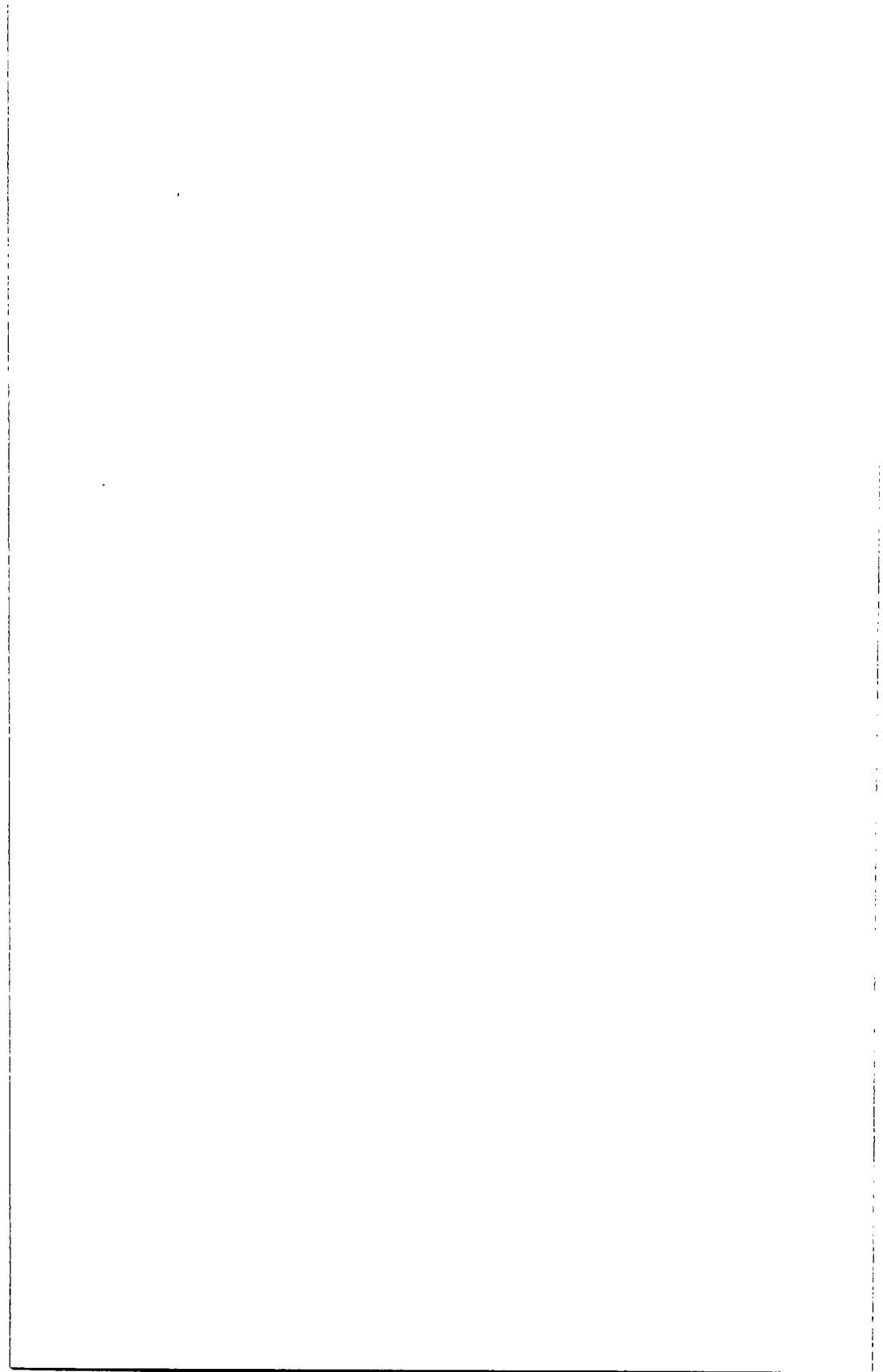
WHAT ABOUT THESE YOUNGER ACTUARIES?

1. Can younger members of the Society practically relate to it in the first few years subsequent to attaining Fellowship?
2. What do younger actuaries expect from the Society of Actuaries:
    a) Within the realm of the Society's operation?
    b) In their professional development?
    c) In their development in the business world?
    d) In their role in society in total?
3. What does the Society of Actuaries expect from younger actuaries:
    a) In its own affairs?
    b) In the profession?
    c) In the business world?
    d) In society in total?
4. How does 1970 differ from 1950 and 1960 with regard to the younger actuary and
    a) The Society of Actuaries?
    b) The profession?
    c) The business world?
    d) Society in total?

CHAIRMAN WALTER S. RUGLAND: The Board of Governors has commissioned an ad hoc committee, the Committee on Professional Development. This session will be a part of that committee's work to the extent that we would like this panel to be a data-gathering session for that committee. As you read communications from the Board of Governors about this committee, I believe that you will find that the committee is really structured to evaluate the contribution that the younger actuaries can make to the Society and the Society can make to the younger actuaries.

Our first question for discussion is, Are the professional aspirations and expectations of the young F.S.A. of today similar to those of the F.S.A. of 1950?

MR. J. DICKSON CRAWFORD: This is a question that is personal and subjective, and it is difficult to give an answer for one's self, much less deal with two different generations. Perhaps we can start the discussion by observing that the young F.S.A. of today is probably more conscious of the professional aspects of the Society than the graduate of 1950 was. If this is valid, it is a result of the changing character of the membership of the Society over these twenty years. It is evident from Mr. Henningsen's

paper on the history of the Society that in 1950 the Society was completely dominated by members in the life insurance field, and the voice of consulting actuaries and those in other fields was very small. The rapid growth of the consulting field and its active participation in Society activities have brought the perspective of the Society into better balance and have kept professional matters at the forefront of the Society's considerations. The preparation of a code of professional conduct was another move that reinforced the professionalism of the Society.

To move beyond this observation on results, however, and try to compare the expectations of the two generations of actuaries is much more difficult. I leave it to the Fellows of the year 1950 to speak for themselves, and in the case of the current crop of new Fellows I would expect that the professional expectations are as diverse as the individuals themselves. These range from the highly trained technician exhibiting competence and advancing the knowledge in a narrow specialized portion of actuarial activities to the very broad expectation of an actuary defined by an earlier president of the Society who noted the intersection of actuarial fields with other disciplines and envisaged the actuary as a "man of business with broad and widespread knowledge, with a special aptitude of being able to use mathematical techniques for the purpose of carrying out business processes and engaging in business management decisions." At this end of the spectrum the vision could eventually mean a merger with certain branches of the accountancy field and the management science groups.

MR. WENDELL A. MILLIMAN: I suspect that the aspirations of the young actuaries in the thirties, forties, fifties, sixties, and seventies are all somewhat similar. I myself think that the primary aspirations of any new entrant into the profession are to earn a comfortable income and to gain satisfaction and recognition.

MR. FRANKLIN D. PENDLETON: In terms of expectations I think that the professional outlook of the young F.S.A. in 1970 probably differs markedly from that of the F.S.A. in 1950. I have to confess some ignorance about the situation in 1950, but actuaries now have professional interests in additional fields—such as consulting, which was in an incipient phase in 1950; computer-related areas, which were totally unborn in 1950; and investment work—much more broadly than was the case in 1950.

In terms of opportunity, I think the F.S.A. of 1970 can look forward to a much greater demand for his services. For example, there are about three times as many life insurance companies now as there were in 1950.

Most of these companies are much larger than they were then and need more actuaries. Many more consulting firms exist now than existed in 1950. Of course, to counteract this there are more actuaries today than there were in 1950, but the increased demand has certainly placed the F.S.A. of 1970 in the pleasant position of good financial opportunity.

I am, however, a great believer in the theory of "compensations," that is, for everything you get, you give up something of about equal value. In exchange for this broader opportunity, I suspect that most recent F.S.A.'s regard the general level of technical skill in purely actuarial matters of the F.S.A. of 1950 as superior to their own capabilities.

MRS. ANNA MARIE RAPPAPORT: The actuary starting in his profession might ask himself, "What is the scope of my professional interest?" The answer might include: (1) only topics related to the life insurance and employee benefit fields, (2) only topics related to the use of life contingencies and related business problems, or (3) only topics related to applications of mathematics, probability, and statistics in business fields and related business problems. Life contingencies is a highly developed set of such applications.

In 1950 or 1960, I believe the answer would nearly always have fallen within items 1 or 2. In 1970, for many younger actuaries, I hope that this answer will fall within item 3.

The business environment has changed, and this change should be recognized in several areas:

1. Mathematics and statistics were not commonly used for the solution of business problems in the past. Today, analytical tools are being developed, and business problems are being looked at in new ways.
2. In the past most life insurance was sold by companies that were in the insurance business and not in any other businesses. Today these companies are expanding the scope of their operations, and noninsurance companies are entering the insurance business.
3. Data processing has made volume computation cheap and relatively easy. This will allow the use of analytical tools to become more widespread.
4. The life insurance company business environment is also changing. We find that we cannot separate life insurance from investment programs and that we must now offer equity products. We find that problems of health insurance are connected with the delivery of health care, and companies in the life insurance industry are now concerned with delivery of health care.

   Jobs for educated people are much more readily available, and the industry is having great difficulty recruiting new agents. Young people today have never lived through hard times and are not as security-conscious as their

parents. Also they tend not to recognize the same type of lifetime responsibility to their families. Life insurance plays a very different role in their financial planning than it did in the planning of their parents.

The rate of change is increasing, and, as a profession, we can be prepared to face that change by equipping ourselves with the tools for dealing with new problems.

CHAIRMAN RUGLAND: Many actuaries today have top management positions in their companies. We often say that this is in part because they have been exposed to nearly all aspects of the operation of life insurance as a part of their examination training. This understanding of the business together with technical knowledge puts them in a good position to be able to manage the entire enterprise. The technical background of actuaries included understanding of most of the technical fields needed for running the business. Can the new Fellow of 1970 who aspires to rise in management do so on this thesis?

MR. MILLIMAN: I think the question assumes too narrow a basis for a man to rise to top management responsibilities. Certainly technical training and knowledge are helpful, but they simply do not furnish a sufficient foundation for an individual to rise to a top executive position. We must recognize that there are many ingredients involved in the successful management of an insurance company other than the technical aspects, such as the sales and investment management. One of the most important ingredients of a top management person is ability to communicate and to influence others. These are not necessarily qualities which grow out of technical training; but, if an actuary has these capacities along with his technical training, he has an excellent opportunity and justification for aspiring to top management responsibility.

MR. CRAWFORD: I had a variety of reactions to this thesis, but they all boil down to one simple response: "No! It takes more to be a president than ten actuarial exams."

There is a variety of talents that make up senior management, and the degree of emphasis among these different talents and roles becomes so marked that the whole character of the job changes, and so must the person.

Our actuarial training speaks only to the technical side of the management role. We certainly do not learn anything about the human side of management; and, while we may have developed some conceptual skills in passing our exams, the only important consequence is how we use

them, whether to advance or retard the organization. Our instruction does not condition us to be original, experimental, innovative, but it does teach us the controls to build around an experiment to monitor cost and profitability.

Thus I suggest to the new Fellows of 1970 that the divine right of actuaries to inherit senior management positions, if it was ever really true in the past, is no longer true for the future. The technical training is a valuable starting point, but other techniques must be acquired and the actuary must move beyond his technical perspective and take on the full array of responsibilities if he wants to be part of the fundamental decisions influencing the direction of his company.

MR. DAVID R. CARPENTER: In the past it has been true that some sizable companies have limited their search for presidents to the available pool of actuarially trained people. I do not think that we are going to see much of this in the future, since many of those same companies have already begun to pick their next presidents from the entire pool of executive-caliber personnel. Due to his broad technical background, the actuary with good management skills will still have the edge.

CHAIRMAN RUGLAND: I feel that there certainly is a great deal of difference between the professional aspirations and expectations of the F.S.A. of 1970 and the F.S.A. of 1950. There has to be, and I think this has been brought out well by the panelists. The field in which the truly professional actuary is involved today is much broader and in every segment much deeper. The professionalism is stronger, and I am sure this will continue to be so. The professional aspirations and expectations of the young actuary are going to continue to be greater.

The actuary today, and indeed over the last thirty years, has a problem, in that one almost has to be an actuary in order to know what an actuary is. We have done a poor job, individually as well as professionally, in making the public knowledgeable about actuarial science. We must be aware of this constantly, particularly as we look foward to assuming broader management responsibilities, whether in top management or in lower management. The awareness required lies in the fact that only coworkers in our own companies and, in some instances, only within our sphere of operations really have an appreciation and understanding of what we do and how we think as actuaries.

Our responsibility is to make as many people as possible aware of what we can do. Our comprehensive and rigid standard of examinations is important and of great benefit to management. Let us make them aware of

this. Yet they are looking for managers, and actuaries are not trained managers. We need our continued education program to do this, for there are many parts of the young actuary's aspirations which are not touched on during his technical training.

MR. WALTER B. LOWRIE: More public relations work is needed. In the universities in California, students still have only a vague notion of what an actuary is. I gave a talk to the Mathematics Club of the University of Southern California for their Career Day. Several students approached me afterward with a good deal of surprise at the opportunities we offer the student who is interested in applied mathematics and a future management position.

Increased contact with universities could both give more widespread help with the Society's examinations and "spread the gospel" about our profession.

CHAIRMAN RUGLAND: Examine the Society of Actuaries as a professional organization. What does it mean to you (identify those attributes of most value)? What do you *wish* it would mean?

MR. PENDLETON: With regard to what it means to me now, and I speak in practical terms, the Society is a professional organization that helps establish my credentials to practice the craft of actuary. In the consulting environment, clients are very often concerned about the competence of the consultant and about the amount of credence to be placed in the advice that he conveys to them. It is important to me to feel that my confidence in the Society as a professional organization is justified, that the Society does have high standards which provide a firm foundation for my professional practice. This resulting professional self-confidence is an important element any time one deals with actuarial consultant problems.

The Society, and I now speak more broadly, serves as a forum for continuing self-education. There are now renewed efforts in this area, primarily through exposure to professional literature and participation in meetings such as this. From another viewpoint, the Society provides simply an opportunity for the actuary, especially the younger actuary, to develop valuable contacts. These can be friends, advisers, potential clients, and even potential employers.

MR. CARPENTER: The Society is basically on a good course with its professionalism, people contacts, and competence. But I wish that it meant more to me.

From a professional standpoint, I have felt that there is a sort of "in group" in the Society. In addition, I have the impression that the Society is cloaked in a certain mysticism that I think most young members as well as outsiders do not really know or understand. We need more communication inside and from the inside out.

I think that my own personal status in the Society may have been jeopardized to some degree by my moving to a smaller company. I wonder how many man-hours and dollars are hidden in the operation of the Society in a given twelve-month period. A lot of work is done by secretaries or other subordinates, and this is a luxury of the larger organization. I cannot imagine my organization being able to support me to the extent that I would like to participate in the Society under today's structure.

MR. PAUL A. CAMPBELL: In addition to the personal challenges that Frank mentioned, the Society means something else to me as a professional organization, and that is "potential." I have always been impressed with the vast amounts of untapped energies and abilities that exist in the membership of the Society that, if channeled and used to their fullest extent, could offer such great assistance not only in the profession itself but in society and in business.

CHAIRMAN RUGLAND: Does the Society of Actuaries need to offer "nonactuarial" self-development opportunities which may answer younger actuaries' foremost personal and professional requirements? Define the scope.

MR. PENDLETON: I think the Society is perhaps overconcerned with the practical problems encountered by actuaries in their professional work and in developing techniques which offer solutions to those problems. There are very few conscious attempts by the Society to provide the individual actuary, the younger member, with any philosophical bases for his professional development. This relates to the matter of the conceptual development of the actuary. I do not believe the Society does a good job in this area.

The younger actuary has, in the main, a problem. He must identify his role in society as something other than just a numbers man who calculates answers to problems. I think the younger actuary currently has to find for himself outside our professional education structure the way to think soundly in conceptual terms about many of the professional and personal problems he faces. The Society could play a much more positive role in the professional maturing process of the younger actuary.

MR. MILLIMAN: I wonder whether this has some interrelationship with another question being discussed rather widely and sometimes with considerable heat, that is, the character of our educational system for developing actuaries. This is intertwined with the question of whether our examination system should be structured to fit a self-study type of educational process or whether we should try to restructure our educational process so as to get more of the training of the future generations of actuaries handled while the men are still on campus. I merely raise the question and will not try to give an answer.

MR. CRAWFORD: My first reaction to this question was negative. While I recognized that some "nonactuarial" talents were necessary in certain applications of our profession—particularly management—I felt that the Committee on Continuing Education had carved out quite a list already and to add to it would bring the whole thing to a grinding halt.

But the more I look at the seven areas defined, the more I ask myself, Why not some of the fundamentals of management? There is getting to be a well-defined reading list, and the student actuary or the recent graduate ought to be made *aware* of the fundamentals of management so that he can pursue the available material if he wants to.

It is true it is a responsibility of the corporation, but not all companies or consulting firms have the resources of larger corporations. Is not the Society wrong in abdicating completely?

I will mention a few examples and try to show that they are close to the scope already defined in our seven areas of continuing education.

Marketing is already on. Can one study marketing from the points of view of the consumer and the salesman and never talk about motivation?

Is not the employee fringe benefit a tool of management related to motivation? Can one talk about these benefits in the seventies without mentioning the objectives of the employer on the performance of the employees?

We have recognized since the earliest days of our profession that an actuary is next to useless if he cannot communicate his results effectively. Please refer to the numerous discussions by consultants on the effectiveness of pension valuation reports.

Marketing, motivation, management styles, management by objectives, effective communications—why does not the Society have a vested interest in exposing its members to these sciences?

MR. MILLIMAN: I would oppose the idea of putting any of these "nonactuarial" questions on the examination syllabus. It seems we have

too many subjects there now. How far we should go in making such subjects available through the Society to its individual members is a question. Since in most of these areas educational material already exists in a well-organized form, I doubt that it would be profitable for the Society to try to develop its own courses.

MR. JESSE M. SCHWARTZ: Mr. Milliman made the point that the syllabus was too crowded to allow for any "nonactuarial topics." I wonder whether, when he says "crowded," he means crowded with in-depth information to make us better actuaries or crowded with information to find out how well we can study?

MR. CHARLES B. H. WATSON: I think we have to be careful that the examination syllabus is designed to elicit principles and to focus upon those general organizing techniques that lie behind the actuarial profession. It would be a grave mistake if we decided that we had to learn a lot more than that during the exam period, because, if we do, we are going to find that our particular power center is cut away from beneath us.

Actuaries face enough trouble in dealing with operations research experts and others who are in effect trying to come into the actuarial profession. We must make sure of our own household before we broaden ourselves and build a superstructure on top of it.

MR. DANIEL M. ARNOLD: There is a revolution going on in education, taxation, and expenditure of funds. Each of us as knowledgeable citizens who understand some of these complexities has a responsibility to the public and to our families to share that knowledge.

I think that the Society of Actuaries should consider whether it is fulfilling the needs of its members in regard to the other aspects of an individual's life. I suggest that the Society should have a part of its meetings given over to a discussion of the involvement of the membership in the community and in the affairs of the public in general. It would make for good public relations both among the membership and in attracting potential members to hear what our members are doing, how they became involved, and what opportunities are available.

CHAIRMAN RUGLAND: As a student of the Society, I became a ward of it, especially when there were two exams each year. Other than my family, there was only one entity I basically served, and only that entity had my complete interest. It was the Society; and, indeed, it was a unique organization in that regard.

Then, suddenly, I emerged with a professional stature that perhaps was higher that I could really imagine, and I challenged the Society to think about whether or not it had a responsibility to try to mold me into a person able to accept the position it had made for me. In this entire area the Society's relationship with its students is unique, and the problem that this relationship creates is one that the Society must be interested in solving.

What can younger actuaries contribute to the Society of Actuaries? Classify these comments in terms of contributions to the Society itself, to members of the Society, and to the public through the Society.

MR. PENDLETON: I think younger members can and to a great extent are contributing a great deal to the mechanical functions of the Society; for example, exam grading, committee service, organizing Society meetings, and the like.

There are three important areas in which the younger actuary may be particularly qualified to serve the Society. First, I think that the Society needs to remain closely in touch with the rapidly changing structure of our nation. There is always the danger of our numerically small and narrowly specialized organization's assuming an irrelevant role in our society. Second, there is a continuing need to perpetuate the profession within an acceptable framework, and the younger member, through his own progress in professional development, is doing this daily for the Society. Third, there is a need to recruit new actuaries, and this can probably best be done by the younger members, who can stimulate the interest of college students in the profession.

MRS. RAPPAPORT: Each and every younger actuary needs to contribute something of substance. We need the support of all our membership if we are to provide our membership with an organism that will help the profession to move forward.

MR. RALPH E. EDWARDS: One may suggest that the younger actuary normally has not ceased to be a debtor to his profession or become a help and ornament thereunto until he has at least once met the requirements of the Committee on Papers. By learning how to write an acceptable paper for the Society's *Transactions*, the actuary is contributing not only to his own development but to the Society and its members as well, and possibly even to the public. The recent scarcity of papers should be a matter of concern to each Society member.

MR. CARPENTER: Although I have not developed it extensively, I have been wondering whether we could not make use of a "big brother system." The idea would be to assign a younger member either at the Associateship or Fellowship level to an older Fellow of the Society, preferably one in the same geographic area. It would be hoped that the voluntary association between the two would help the younger member relate to the Society much better than has been true in the past. Also, such an association should help the older member remain more aware of the Society's history, goals, and ideals than he might otherwise be. If I can use the term "communication gap," such a system might help the Society to minimize such a gap.

MR. CRAWFORD: We can contribute the "enthusiasm of amateurs" (to paraphrase a popular political author). We have not yet had the time or the experience or the wisdom to become "too professional, too aware of criticism, too sensitive to what *cannot* be done."

Specifically, we can contribute in two ways.

1. To the members individually, we can contribute an infusion of new ideas. I see this taking place on three levels.

First of all, the younger actuaries need a forum composed of their contemporaries where they can trot out their wild ideas and pet projects and sound out reactions. Out of this process the ideas with merit will probably survive and be reinforced, and the trivial and ill-conceived will die quietly and without embarrassment.

It may well be that the best place for the first level of this process is in the local younger actuaries' clubs, but the Society should have an interest in seeing that it happens and may find a way to provide the experience for those members who do not have access to these regional groups.

The second level occurs when the best of the ideas that filter through this process are brought to a Society workshop and are presented in the invaluable interaction between enthusiasm and innovative desire, on the one hand, and wisdom and experience, on the other.

Finally, the refined concepts begin to appear in the written record of the Society and are accepted into the body of actuarial knowledge.

2. The younger members can offer to the public through the Society one thing—involvement. The difficulties in resolving corporate involvement of the Society in public matters cannot be an excuse for us as individuals to retire from the world into those famous ivory residences of traditional professionals.

CHAIRMAN RUGLAND: Would you advise a high school senior to pursue an actuarial career? Why or why not? How would you answer his question about relevancy? Where would the role of the Society fit into your discussions?

MR. CARPENTER: I would never attempt a hard-sell approach when discussing the actuarial field with a high school graduate. I like to cover all the advantages and disadvantages I can think of, pointing out to him what I feel his aptitudes and desires should be if he wishes to enter the field.

I think that the relevancy question is answered quite easily by simply defining what an actuary does. Depending on the degree of social relevancy desired, the student is able to direct his career into various areas. For instance, I should think that serving with the Social Security Administration would be of extremely high social relevance.

MR. PENDLETON: Obviously the fruits of success in our field, that is, attractive income, career-advancement possibilities, and opportunities for professional and personal development, are abundant. The road to success in our profession is difficult, however, and, in advising or encouraging students to pursue an actuarial career, we should discuss the situation of the person who does not achieve the full measure of success; for example, those who do not complete the examinations or those who drift from company to company without finding the environment which best suits their desires and abilities. Such persons would be unlikely to recommend an actuarial career. Perhaps our profession differs from comparable professions, such as law or medicine, in that one either becomes a doctor or lawyer or he does not; there is no middle ground.

The existence of the Society as a strong force for assuring professional competence and as an educational agency would count importantly in any discussion of the advisability of pursuing an actuarial career. To emphasize the obvious, imagine a typical college graduate trying to become a skilled, competent actuary without the guidelines laid down by the Society. Some of you would have achieved this goal because of sheer intellect or determination; I would not have, and neither, I think, would most of us.

MR. MILLIMAN: I would not make a flat recommendation to anyone that he enter the actuarial profession. However, I would advise any young man or woman who appears to have the appropriate interests and qualifications to explore the actuarial profession and to compare it with

other avenues of application of his or her talents. That is as far as I think it is appropriate to go in advising anyone at such an early stage in his education and development.

CHAIRMAN RUGLAND: I am concerned that there has been no one who has said that he would actually advise a student to pursue an actuarial career. Most have said that they would not take the responsibility for convincing someone to pursue our career because of the risks that are involved. I cannot agree with this. I strongly believe that as professionals and as members of a profession we have the responsibility to advise and encourage people to pursue our career. But advice toward pursuing an actuarial career must be given completely in terms of pitfalls and commitment of time, both causing us to be concerned about advising a person to pursue the curriculum.

Wake up to one fact. If we do not feel as actuaries and as members of this Society that we can advise people to pursue our career, the actuarial profession has a most difficult problem facing it in the future. If we are not able to convince people to pursue our career, who can?
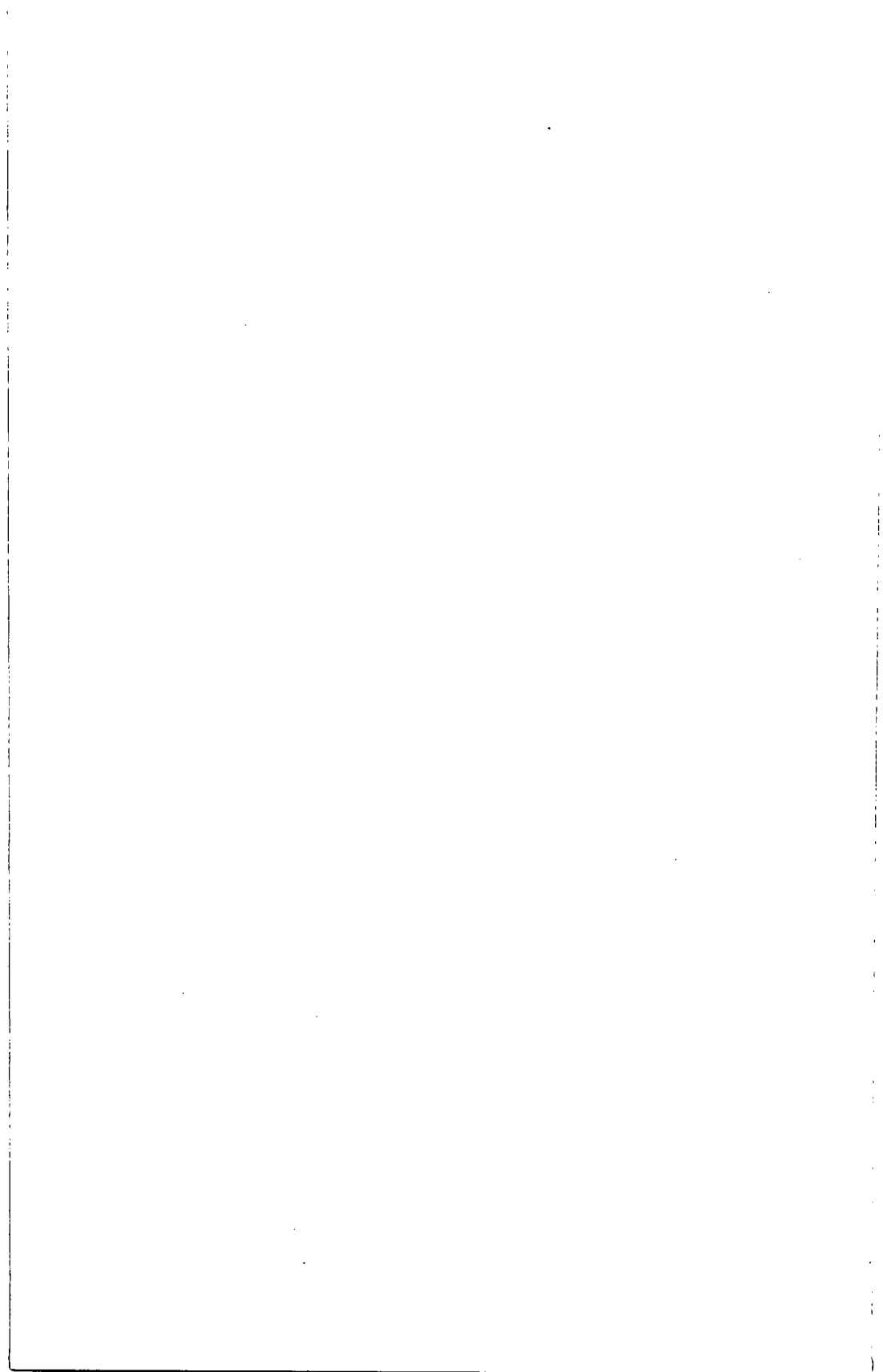
SOURCES OF STATISTICAL INFORMATION
FOR ACTUARIES

CHAIRMAN WALTER W. STEFFEN: The purpose of this session is to provide a critical evaluation of the reports made by the Society's Committee on Mortality and Morbidity; of selected reports on mortality and morbidity of the United States National Centers for Health Statistics; and of mortality and population data from the United States and Canadian censuses.

We plan to conduct this session on a meet-the-press format. Each of the panelists has special knowledge and experience in specific areas of our business, as follows: Mr. John Mahder, group insurance; Miss Clunas McKibbon, Canadian insurance; Mr. Fred Seltzer, United States government reports; and Mr. Richard Ziock, individual insurance.

The need for this session is indicated by the importance of reports in our business. The volume of reports has increased tremendously. It can be measured by the 278 pages in the most recent *Reports Number*. In addition, a very large number of reports emanate from government offices. Actuaries feel the importance of and responsibility for combining resources to prepare statistics and reports for the profession. Reports are useful to us in rate making, coverage design, claim-loss control, underwriting, and meeting the needs of regulatory or tax authorities. Should we expand or contract the scope of our reports?

The cost of preparing reports has become increasingly great. In 1965 Ed Green estimated the cost at $500,000 per year. One can easily speculate that it has risen considerably since that time. In addition, it is practically impossible to measure the amount of unallocated expenses, such as salaries and maintenance of files, which occur in a company's operation. With computers there are other problems, such as data bank problems. The necessity for uniformity and the resulting rigidity of the format and the extensiveness of record-keeping activities for each company concern many actuaries. When joint special studies are made, new problems are introduced when the contributors do not have their data in format or available on computer records.

The panel is assuming the posture of evaluating reports from the consumer's viewpoint. Consumerism is in vogue. We are placing our principal emphasis on this topic from the viewpoint of the actuary who uses the reports.

Are the currently published reports adequately serving the needs of

actuaries? If not, in what areas are these needs not fulfilled? Some actuaries indicate that they would like to have reports or statistics available in certain areas where studies are not now made. What are some of these areas?

MR. RICHARD W. ZIOCK: I think one of the areas where our needs are not properly fulfilled is our developmental needs. When we attempt to develop a new policy form or a new type of health benefit, we have problems predicting what the experience is going to be. I think that a remodeling of our studies much more in line with attempting to analyze the experience by very basic characteristics would make the data more useful. Detailed claim studies rather than frequency studies would be more usable. For instance, our annual studies under ordinary insurance represent the experience of about twelve or fifteen large companies in the eastern part of the United States. Sometimes this experience is not that good for the smaller and medium-sized companies. They have a different class of policyholders, and they may have more credit insurance and other specialty lines. Also, the income distribution of the clientele is very important. If the studies provided more statistics related to their basic characteristics, such as the type of business, income brackets of clientele, and many others, they would better predict future results. Each of these characteristics can greatly affect the experience of the company.

Another area where our needs are not quite fulfilled is in the long-term disability field. This is a problem, however, that I do not think statistics will solve, because the loss-of-time experience is strongly affected by the economic trends, which makes a long observation period necessary to accumulate reliable data. In addition, there does not seem to be enough exposure among all the companies to accumulate timely long-term continuance data. Under the Society's individual accident and health study on loss of time in the second year of disability, we currently have about eight hundred claims on many diverse plan types; you can see, therefore, that it is difficult to get long-term disability experience.

In major medical and other medical expense coverages, we naturally have a problem, because inflation tends to make obsolete our claims continuance tables and frequency data as well.

I believe that we need more fundamental studies along the lines of determining the characteristics of experience according to demographic factors which would be of high value and more helpful in developmental work. The current studies are more evaluative of what has happened but do very little in attempting to analyze why it has happened. Many times shifts in the characteristics of the data cause spurious trends which are not analyzed.

One of my chief suggestions for profitable new studies is to make a very definitive and exacting study of lapse and conversion rates. In this connection perhaps Louis Levinson's plea for simultaneous compilation of lapse statistics along with mortality statistics deserves renewed attention. Mr. Levinson made this request in his "Theory of Mortality Classes" (*TSA*, Vol. XI) because of the interdependence of the lapse and mortality rates due to antiselection on withdrawal.

This study should be broken down by meaningful characteristics, such as by type of agent, by size, by bracket of income the applicant is in, by plan, and so forth. In the study of conversion rates, the defining characteristics would be some measure of the amount of effort on conversions and, of course, the plan, policy duration, and age at issue. Perhaps intercompany studies of lapse and conversion rates along these lines would result in data useful to most companies.

We need to study more in-depth, guaranteed issue, accept-reject, and other new underwriting techniques. They each have a much different experience, and the *Reports* do not currently meet the need. I grant you that they are hard to study; perhaps what we really need are more papers where a homogeneous block is studied and described.

Another area where we will soon need experience is in comprehensive medical, which is replacing basic hospital and major medical at Continental Assurance and might possibly outdate the studies that are being made by the Society on individual medical expense coverages.

MR. JOHN MAHDER: In general, I believe that the current group life reports are "adequate," although the term is subject to various interpretations, depending upon what the actuary is looking for at the time. These reports might better meet the needs of actuaries if the following items could be added or improved.

First, the cost of special disability benefits in conjunction with term life insurance, such as premium waiver to age 65, is currently not studied. Limited demand and available experience, however, could mean the costs of such a study would exceed the value obtained.

Second, reports of experience by industry could be improved. Previous reports are based on obsolete industry classifications, but I believe that the *1970 Reports Number* will show experience related to the Standard Industrial Classification coding system. This should be a substantial improvement. Experience by type of group (single employer, Taft-Hartley welfare funds, etc.) would also be helpful.

Finally, male versus female experience is not available, and published mortality experience by age, industry, and type of disability benefit could be distorted by variations in female content.

Additional coverages that might be suitable for study include group accident and survivor income plans. A survivor income study could cover annuitant mortality with special consideration of widow remarriage rates and how reduction or cessation of survivor benefits might influence remarriage.

In the group health field, the needs of actuaries are not adequately met by current studies.

First of all, timeliness of data is a continuing problem which apparently shows little prospect for improvement.

Next, special detail claim studies have been conducted only infrequently in the past. The latest temporary disability income study was based on 1949 claims, the surgical study used 1955 claims, while the hospital and comprehensive medical studies utilized 1957 claim data. None of these studies contained complete exposure and claim characteristics to permit an actuary to arrive at cost variations by age, area, and sex.

To mention another area, the benefit combinations included in the basic medical studies particularly have not kept up with plans currently sold and in force, such as semi-private hospital, relative-value surgical, reasonable and customary physicians' benefits, and the like.

Also, we do not have information on long-term disability experience, such as termination rates among disabled lives at the longer durations. An additional year of exposure is added to the study each year, however, and in time experience at the longer durations should be available.

There are a number of group health studies which, if made, would help to meet the needs of actuaries. These would include a study of dental experience and updated studies of individual claims related to exposure for TDI, basic hospital and surgical, and comprehensive medical. These needs will be partially met by the 1969 report of the committee, which will include individual basic hospital and surgical claim experience related to exposure by age, sex, and area.

Finally, it seems that everyone is aware of the rapid increase in the cost of medical care, and demands are heard that steps must be taken by providers and insurers to exercise controls in the delivery and cost of medical care. Innumerable articles have been written on this subject, but I believe there is a need for studies relating to actual charge and utilization levels and patterns. We need something more than that which individual companies are able to derive from their own experience.

MR. FREDERIC SELTZER: Government reports are produced by many agencies to serve various purposes. A major problem is making their existence known to the profession. They cover a wide variety of

actuarial needs—mortality, morbidity, disability, population counts and characteristics, to name a few. They can adequately serve the needs of actuaries if actuaries know of their availability and can obtain them.

I would like to discuss some of the United States government publications at this time:

a) Public Health Series No. 1,000
b) Research and Statistics Notes
c) Health Insurance Statistics
d) From the Social Security Survey of the Disabled, 1966
e) Vital Statistics of the United States, Annual and Monthly
f) Actuarial Notes of the Social Security Administration

They cover the varied topics listed below:

Public Health Series Publication No. 1,000.—Series 3: Analytical Studies— Mortality Trends in United States; Infant and Perinatal Mortality in United States; Data on Other Countries. Series 10: Data from Health Interview Survey—Incidence of Acute Conditions, Disability; Chronic Conditions, Activity Limitation; Physician Visits; Prevalence of Selected Impairments. Series 11: Data from Health Examination Survey—Blood Pressure Values; Height, Weight, Body Dimension; Prevalence of Coronary Heart Disease; Hypertension; Blood Glucose Levels; Serum Cholesterol Levels. Series 12: Data from Health Records Survey—Institutional Records of Charges, Patient Characteristics. Series 13: Data from Hospital Discharge Survey—Utilization; Length of Stay. Series 20: Data on Mortality—Infant Mortality Trends; Smoking; Suicide; Homicide.

Research and Statistics Notes.—Enrollment and Finances of Blue Cross and Blue Shield Plans; Early Retirement; Health Benefit Plans under Collective Bargaining; Income Protection against Illness; OASDHI Beneficiaries Receiving Government Pensions; National Health Expenditures; Employee Benefit Plans; Veterans' Legislation; Retirement Test; Prescription Drug Prices and Costs; The Social Security Trust Funds in the New Unified Budget; Fiscal Impact of Social Security Securities Program.

Health Insurance Statistics.—Current Data from Medical Program; Medicare and Care of Mental Illness; Per Capita Benefits by State; Use of Hospital Services under Medicare: Length of Stay.

From the Social Security Surveys of the Disabled, 1966.—Medical Care Utilization by the Disabled; Epidemiological Factors in Disability; Medical Care Costs for the Disabled; Identifying the Disabled; Prevalence of Disability.

Vital Statistics of the United States.—Volume II: Mortality. Part A: Rates— crude, age-specific, age-adjusted, by cause of death, sex, color, and race; infant mortality, fetal mortality, accident mortality, life tables. Part B: Geographic detail.

Monthly Vital Statistics Report.—Data on births, marriages, divorces, and deaths.

Actuarial Notes of Social Security Administration.—Mortality of the Aged before and after Medicare; Hospital Utilization and Costs; Social Security Benefit Formula.

This is the year of the United States decennial census. A large volume of material will be available from the Bureau of the Census. A brief description follows:

1. *Printed Census Reports.*—The results of the 1970 census will be released as soon as they are tabulated and assembled. Two major media will be utilized: (1) printed reports and (2) magnetic computer tapes, including microfilm and printouts therefrom.

a) Population Census Reports. Three preliminary series will be issued from June to October, 1970. These figures will be superseded by those in the advance and final reports. Two advanced series will be issued from August to December, 1970, presenting selected data prior to their publication in final reports. There will be final reports issued starting in September, 1970.

b) Volume I: *Characteristics of the Population.* This volume will consist of separate reports for the United States, each of the fifty states, District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa, Canal Zone, and Trust Territory of the Pacific.

c) Number of Inhabitants. Final official population counts will be presented for states, counties (by urban-rural residence), SMSA's, urbanized areas, minor civil divisions, census county divisions, all incorporated places, and unincorporated places of 1,000 inhabitants or more.

d) General Population Characteristics. Statistics on age, sex, race, marital status, and relationship to head of household will be presented.

e) General Social and Economic Characteristics. These reports will focus on the population subjects collected on a sample basis.

f) Detailed Characteristics. These reports will cover most of the population subjects collected on a sample basis, presenting the data in considerable detail and cross-classified by age, race, and other characteristics.

g) Volume II: *Subject Reports.* Each report in this volume will concentrate on a particular subject. Detailed information and cross-relationships will generally be provided on a national and regional level; in a few reports, data for states or standard metropolitan statistical areas will also be shown. Among the characteristics to be covered are national origin and race, fertility, families, marital status, migration, education, employment, unemployment, occupation, industry, and income.

h) Computer Tapes. The major portion of the results of the 1970 Census will be produced in a set of six tabulation counts. To help meet the needs of census users, these counts are being designed to provide data with much greater subject and geographic detail than it is feasible or desirable to publish in printed reports. The data so tabulated will be available—subject to suppression of certain details where necessary to protect confidentiality—on magnetic computer tape, printouts, and microfilm, at the cost of preparing the copy.

2. *Geographic Tools.*—Detailed maps will also be available.

3. *Microfilm.*—Contents of the 1970 Census First County Summary Tapes will be available on microfilm. The final printed reports will be issued in microfiche form. Microfiche is a sheet of microfilm containing multiple microimages in a grid pattern. As many as sixty images can fit on a 4 × 6-inch card.

MISS J. CLUNAS F. McKIBBON: For Canadian actuaries it is always necessary when looking at the data in the Society of Actuaries *Reports Number* to consider whether or not American data are relevant to the Canadian situation. The Canadian Institute of Actuaries has two established annual mortality studies—ordinary and group—which fill peculiarly Canadian needs. An annual study of income disability experience for both group and individual is now undertaken by the Morbidity Committee of the Institute. No data are available as yet on this study. The health insurance situation in Canada is so different from that in the United States that most of the American studies are not applicable to the Canadian situation.

There have been requests for specifically Canadian studies of annuity experience and of waiver and income disability attached to individual ordinary policies, as this benefit is still being sold in Canada. It has not been possible to make studies of these, and presumably these are still unmet needs of Canadian actuaries.

The government reports published by the Dominion Bureau of Statistics are not as extensive as publications available from the United States Bureau. There are, however, a series of valuable regular reports as well as special ones available from time to time. In the past the Canadian Sickness Survey of 1950–51 was useful for many years in health insurance calculations. These publications are also normally used by Canadian actuaries for calculating marriage rates as required for various premiums and initially were used to calculate the difference between male and female mortality.

MR. CHARLES L. TROWBRIDGE: I would like to emphasize one of the points made by Mr. Mahder. In comparing group mortality experience with individual policy experience, and group experience in one industry with another, we are badly handicapped by the aggregation of males with females. The male-female mix fluctuates widely, and, since female mortality is significantly better than male, it is very difficult to interpret any mortality differences exhibited.

Another problem of interpretation in group mortality statistics arises from our inability to judge the effects of termination of employment. If employees in terminal illnesses tend to terminate employment before

actual death, group mortality will appear to be better than it really is. I have no idea whether this potential effect actually occurs to any significant extent. If so, it should be noticeable in group conversion experience.

MR. DANIEL F. CASE: It may be of interest to know that the LIAA-ALC are preparing to submit to the insurance departments of Maine, New York, Ohio, and Pennsylvania a proposal to change their current regulations establishing minimum first-year premium rates for group term life insurance. The proposal includes a substantial reduction for female lives, based on the assumption that female mortality equals about 60 per cent of male mortality at corresponding ages. Companies would be permitted to select one of several equivalent methods of calculating the female reduction, in order to permit use of established computer systems. Since the Society has not compiled statistics on group life mortality by sex, we developed the 60 per cent figure from published United States life tables.

I feel sure that companies will take advantage of the female rate reduction if it is adopted by the four states. Perhaps the female rate reduction will also give companies an incentive to study their female mortality experience in more detail than they are doing now.

CHAIRMAN STEFFEN: The high cost of preparing statistical reports is known to all of us. A question is often raised with regard to the value of continuing to prepare certain reports. Since individual actuaries or our companies are financing the preparation of Society reports, we should occasionally ask ourselves whether certain reports are necessary or whether we are realizing maximum benefit from our expenditure.

Should we consider eliminating any reports? Should we consider replacing some reports with related studies? Should we consider preparing some reports less frequently?

MR. SELTZER: There is a Committee on Outside Sources that has been investigating the use of data from sources outside the Society, such as the Veterans Administration, which has medical data from their hospital records. I do not know what progress the committee has made.

Questions have been raised concerning the possibility of replacing Society mortality data by government data. One would have to relate data based on insured lives to data based on the general population, periodically adjusting government data for insurance company use in the periods between studies. But much data would probably be lost, and the special studies might be as costly as, or more costly than, the present studies. An example of this type of study which expresses such relation-

ships is that of Morton and Schmidt, "Trends in Mortality among Insured Lives," delivered at the International Congress.

MISS McKIBBON: We are all concerned about the high cost of studies, both for the contributing companies and for the compiling company. I am not sure, however, that replacement of continuing reports by special studies would result in savings over all. The cost of preparing material for special studies, particularly if it is necessary to refer to applications, can be much higher than the cost of collecting the material on the continuing basis.

The question is raised whether any of the studies might be omitted, and I would refer to the aviation study. I feel that we should be looking forward to the day when the aviation study can be considered a part of the regular occupation studies, either as a hazardous occupation or a hazardous hobby.

MR. MAHDER: The group life reports are published on a periodic basis to show the frequency of death and disability, the experience of disabled lives under approved premium waiver claims, and group conversion mortality and withdrawal experience; in my opinion they should not be eliminated or replaced.

The annual basic hospital and surgical aggregate claim study in the present format and with outdated tabulars has little value, and I believe it will be discontinued after the current report. If a similar study is made in the future, it should be based on a wide range of benefits with experience measured against an updated tabular.

MR. ZIOCK: I think that one report is rather marginal as far as my company's needs are concerned. We have very little new business under life income settlement options. From my point of view, some of the annuity and settlement option experience may as well be combined.

MR. J. ALAN LAUER: Whenever it is suggested that a particular study be modified or discontinued, it is almost inevitable that someone will object. In this case I feel it is important that we continue to study the mortality under life income settlements and matured deferred annuities. Penn Mutual, like many other companies, provides a special life income settlement with income equal to 103 per cent of the income that would be provided under a similar single-premium immediate annuity; this special option is available whenever it provides a more favorable income than the regular settlement options contained in the policy. Considerations for

supplementary contracts with life contingencies in Penn Mutual are more than twice the single premiums for immediate annuities, and under current conditions most of the life income settlements are on the special 103 per cent basis.

Because of this, it is important to consider the mortality under life income settlements as well as the mortality under immediate annuities when setting premiums for immediate annuities. It is my observation that the mortality under these two classes of business is not the same. Mortality on life income settlements with a certain period is closer to mortality under immediate nonrefund annuities than it is to mortality under immediate refund annuities. Possibly the studies of mortality under immediate annuities and life income settlements could be combined into one report. The report might then attempt to provide some explanation for the difference in mortality under these two classes of business.

CHAIRMAN STEFFEN: How might the reports be made more interesting, easier to read, and more interpretive within the existing framework?

MISS McKIBBON: With regard to making these reports somewhat easier to use, I would suggest that the readers of the *Reports Number* are of two types. The largest number scan the text to find whether there are any startling results and make an attempt to compare their own companies' experiences with one or two of the main results. A much smaller number will, on occasion, want detailed information to deal with a specific problem.

Two problems then arise. The first problem is the adjustment of the results to reflect one's own company's experience. In this connection it would be a real service to all companies if the study committees would make available an outline of the type of material which should be collected so that companies could have their own data available to compare with the results of future studies. The second problem is obtaining detail in the form desired. I wonder whether it would be possible to remove considerable bulk of the detail from the printed report, pointing out salient changes in the principal results and then making available, for a price, the detailed information from the studies in a semisummarized form. This could be available to the people who wish to use this information for detailed calculations.

MR. ZIOCK: I think that perhaps we should publish a little less lengthy reports in *TSA* but make longer reports available for a fee to the membership and public, too. The longer report would include all the dialogue

and studies that were made when the study was compiled, so that we would be able to understand what went into the studies and the characteristics of the data and the experience developed. This would help to give a person a deeper understanding of what he is reading.

The present policy seems to be to include a minimum of analytical text and a maximum amount of tables. The tables are not worth mud without the words in a lot of cases.

One additional thing that might help is to have the reports authored by one person and so signed. This would put an additional stress on the person to produce a good piece of work, to analyze results, and to make it understandable, readable, and usable. I think that individual authorship might be more compelling than the present committee system is.

MR. MAHDER: The reports would be easier to read and of increased value if a short summary were provided, highlighting the significant changes, if any, since the prior report. In addition, the committee preparing the report should include in this summary comments on any factors which may have changed, leading to results different from those in prior reports, especially where these factors might not be apparent to the reader. For example, the impact of Medicare on health claim costs reported to the group studies was a factor between the years 1965, 1966, and 1967.

MR. SELTZER: Many journals in other professions head their studies with abstracts of their most important findings. I understand that the Society will be doing this in the next issue of the *Reports Number*.

MR. CASE: Speaking as Part 5 Chairman for the Education and Examination Committee, I should like to say that, if we are thinking of condensing the material which appears in the *Reports Number*, we should keep the Society's students in mind. To be sure, the E.&E. Committee is about to reduce the amount of material on sources and characteristics for which the Part 5 students are responsible. Nevertheless, we feel that it is important for the students to discover the kinds of industry data gathered and made available. Our current plans are to retain about five of the mortality reports in their entirety in the required reading. If these reports were significantly shortened, it might become very expensive to provide our students with the material which we would like them to have.

MR. LAUER: If this suggestion is adopted, it is likely that most of the larger companies will request complete sets of the complete reports. Therefore, it would probably be a good idea to bind these complete

reports together in one volume. The abbreviated reports might be made available as a regular part of the *Transactions*, with a separate charge being made for the complete reports.

CHAIRMAN STEFFEN: What other changes do you recommend to make these reports more useful to the membership? What other difficulties or dissatisfactions exist with reference to the current reports?

MR. ZIOCK: I have a comment on the conclusion that has been reached recently that term insurance mortality is as good as permanent insurance mortality. This might be true, but there is a possible bug that should be aired a bit.

The problem is due to the tremendous increase in decreasing term. On the decreasing term insurance bad mortality goes into conversions right away. They convert as soon as they can to preserve the coverage amount. Thus decreasing term mortality is going to be better than level renewable term and nonrenewable term mortality. Renewable term mortality will generally be higher, since on renewal dates there is an increase in premium along with a policyholder antiselection. Renewable term is going down in volume (new business), and decreasing term is going up. Most of the companies are treating term conversions as new business in their insurance accounting (and also in their mortality studies) so that the converted mortality is not treated as part of the decreasing term mortality. This automatically causes a decrease in the mortality on term insurance per se, and I do not personally believe that, correctly evaluated, it is going down that rapidly.

CHAIRMAN STEFFEN: In what manner can the relevant government statistical reports be brought to the attention of Society members? What can be done to make Society members more aware of the existence of specific reports? How can we interest or encourage members to use the reports?

MR. SELTZER: Reviews and brief digests of government reports have appeared regularly in the *Transactions* for many years. More recently, *The Actuary* has been used to publish accounts of some government publications. The *Transactions* provides space for a more detailed and permanent record, *The Actuary* for a briefer but more up-to-date message. I do not know how well these digests and reviews are received or how many members pay any attention to them. Are they useful only to specialists or to the general membership?

VARIABLE LIFE INSURANCE

1. What are the advantages and disadvantages of the various designs of variable life insurance that have been offered or proposed in the United States and Canada? What minimum guarantees are likely to be included?
2. What are the advantages and disadvantages of a subsidiary for variable life insurance?
3. What are the advantages and disadvantages of nonparticipating vs. participating variable life insurance?
4. What marketing and sales-proposal problems will variable life insurance present?
5. What is the current status of state laws and regulations with regard to variable life insurance?

CHAIRMAN JOHN C. FRASER: I would like to make some general remarks regarding the variable life insurance designs that appear to be developing in the United States.

You are all familiar with the fully variable Dutch-type design where the premiums, face amounts, and reserves are expressed in units rather than in dollars and directly reflect the relationship between the actual investment performance of the separate account and the assumed interest rate. The theory underlying this type of policy is exactly the same as that for fixed dollar, and there is a certain beautiful simplicity to this design. Unfortunately, however, the variable premium aspect of the design probably makes it unmarketable. Because of this, fixed-premium designs are being developed, and they appear to be of three general types.

The first of these is the New York Life–type design, in which the reserve per thousand of face amount, as in the case of the Dutch policy, is the same as that for a corresponding fixed-dollar policy. The second type of design is one in which one-year term insurance is purchased and the balance of the premium is used to purchase paid-up variable insurance in the separate account. In the third type of design term insurance is purchased and the balance of the premium is put on deposit in the separate account. In the second and third types the one-year term insurance can be either fixed or variable. The third type, in which the term insurance is on a fixed-dollar basis, is nothing more than a "buy term and invest the difference" arrangement.

The fully variable Dutch-type design is more responsive to the investment performance of the separate account than any of the three fixed-premium designs. Of the fixed-premium designs the New York Life type is

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the most responsive to the performance of the separate account, the second type is the next most responsive, and the third type is the least responsive. For a given level of investment performance in excess of the assumed interest rate, the face amounts under the New York Life type start higher and end lower than those under the second and third designs, while the face amounts under the third type of design start lower and end higher than they do under the other two. The face amounts under the second design lie midway between those for the first and third designs. Generally speaking, for a given level of investment performance the reserves under the New York Life type of design are lower than those under the second type, which in turn are lower than those under the third type.

It is possible to have a great deal of discussion about the relative merits of a design that is more or less responsive to the performance of the separate account. To use a phrase coined by Ardian Gill, it is a question of "need" versus "greed." In general, the New York Life type would tend to be more need-oriented than greed-oriented, whereas the "buy term and invest the difference" arrangements tend to be more greed-oriented than need-oriented. The paid-up variable insurance design lies midway between the two. There are various theories that have been advanced about which product is most salable. That is what makes a ball game, and I think this will be settled in the market place.

MR. D'ALTON S. RUDD: There are several approaches to variable life insurance in use or being considered in Canada. A quick summary might be as follows:

1. The "package" of a scheduled amount of term insurance, level or decreasing, plus the amount in a segregated fund.
2. The "envelope," where there is a stated level minimum death benefit, such as the sum of premiums to maturity.
3. The "reserve" method, where all or a percentage of the reserves is invested.
4. Though not really variable life insurance, the dividend option where dividends are automatically transferred to units of the segregated fund.
5. The "unitized" approach, where all premiums and benefits vary (though I do not believe any are currently being offered in Canada).

Under the first two methods, usually a low percentage of the first-year premiums and a higher percentage of subsequent premiums are invested in a segregated fund. Sometimes there are also surrender charges levied on surrender. The policies are usually based on the endowment concept, although at least one, if not more, could be considered a form of whole life insurance, since the policyowner has the option from time to time or at

the end of the period to purchase paid-up life insurance from the balance in the segregated fund.

The companies investing the reserves in Canada are generally using the approach originally brought out by Harold Lawson and the National Life Assurance Company of Canada. Performance of the equity fund in excess of a stated minimum is used to purchase paid-up additions, which, of course, may be negative. I do not know of any companies planning the approach of New York Life.

The dividend option approach has been used to advantage by some companies with high-premium, high-dividend policies aimed at the retirement market. The administrative complexities of the fully unitized policy have probably been its biggest drawback.

There is considerable variety in detail and options, both within and among the first three classes of policies, and also in the degree of guarantee involved. In some cases whether a feature is an advantage or a disadvantage depends on whether the stock market goes up or down! For example, under the first and third types a good stock market gives an increase in the death benefit immediately, while under the envelope approach a lengthy good stock market may still not be reflected in the death benefit for many years. In a falling market, however, the envelope approach will provide a better death benefit, although some plans of the reserve-invested type place the face amount of insurance as a minimum death benefit.

Before going further, I should perhaps make clear any tendency to bias I have by explaining our own equity life insurance plans. We chose the reserve-invested method and took three of our regular participating plans —whole life, life premiums to 65, and endowment at 65—and brought them out with the same premiums and values but with the policyowner having the option to choose either 25, 50, 75, or 100 per cent of the net level basic reserves to be carried in our new individual equity fund. The regular dividends, which have the same loading and mortality profit but an appropriately reduced excess-interest profit, must be applied to purchase what we call variable paid-up insurance (paid-up additions), and the performance of the equity fund for each policy year in relation to a required level also purchases variable paid-up insurance. This could be negative when performance fails to meet the required level, and the balance of the variable paid-up insurance can go negative. There is also a cash adjustment in any midyear terminal transaction. In any event the minimum death benefit is the face amount.

There are quinquennial rights to change the percentage of basic reserves invested and a right at any time to convert to the corresponding

regular contract. The variable paid-up insurance has all its reserves carried in the equity fund and on conversion becomes regular paid-up additions, or, if negative, it is cancelled and its cash value is payable or becomes a policy loan.

Automatic premium loan is available up to the level of the guaranteed portion of the basic cash value (the percentage of the basic cash value which is the complement of the percentage of the reserves being invested in the equity fund). After that point or, if later, three months after premium default, there is automatic conversion to the fully guaranteed contract. Policy loans are only available to the extent of any guaranteed cash value.

As for the advantages and disadvantages, these to some degree are a matter of opinion, and I trust my comments will be considered in that light. We consider it an advantage in an equity life insurance plan if the following factors are present:

1. It provides nevertheless a minimum guaranteed death benefit, with the possibility of increase with reasonable equity performance (regarding the inflation argument).
2. The agent is neutral—commission and production club credit need not confuse him when with the policyholder.
3. The policyowner in turn has a comparable choice between guarantee or equity at point of sale at the same premium and a facility to leave the market without surrender or reduced paid-up if he does choose the equity path.
4. There is a minimum of special administration to introduce into a complex computer system—for example, dealing with the fund only once a year, not at every premium collection.
5. The plan is simple for the policyowner.
6. It will function on a whole life basis instead of the "buy term and invest the difference" approach.
7. It is clearly a long-term life insurance program where equities are secondary, not primary, avoiding the hot-money type with weekly phone calls to the agent on "What's your unit value today?"
8. It is least disturbing to training and background of the field force (important to a combination company with a large and varied field force, for its first equity product).
9. Some conventional guarantees are available, if desired by the policyowner.
10. The usual range of additional benefits is available so that the policy can be used as any other in programming needs.
11. The contract minimizes the replacement problems that we understand were suffered by some companies.
12. It is simple to design.

These advantages are from my own point of view. They also assume that the life insurance is not to be window-dressing on an equity savings contract. They may be disadvantages to others, particularly to those in other types of companies. In our own case, we feel that our version of the reserve-invested approach gives the best results in meeting these criteria. This method perhaps falls down on item 5 (simple to the policyowner), since, though the concept is simple, the details can be confusing, especially to the layman. By using our existing contracts in this approach, we were able to have all material ready for the approval routes in five months, including July and August.

MR. THOMAS P. BOWLES, JR.: In view of the fact that the other three panelists will adequately discuss the design of variable life insurance, John Fraser has asked that I make some over-all philosophical comments and report briefly on our impression of variable life operations in the United Kingdom.

The excitement of variable products arises from several sources:

1. Newness.
2. Glamor.
3. Alleged solution to the problem caused by the voracious appetite of inflation.
4. Appeal to the all-too-human desire for economic gain, referred to vulgarly as greed.
5. The prevailing conviction that variable products will be the savior of the insurance business coming at a time when it needs a messiah.

Paradoxically, our affection for the new breed of products has generated severe emotional conflicts arising from the following:

1. A lingering conviction that fixed-dollar guarantees, and fixed-dollar guarantees alone, should be the product of the life industry.
2. Uncertainty as to how traditional agency compensation can be translated into the equity product to satisfy conflicting objectives of agency and the consumer.
3. Unwillingness to restructure significantly the distribution system to provide for lower unit cost of distribution.
4. Resistance to change by a large segment of administrative and sales management.
5. Reluctance to assume the burden of guarantees of stated maturity values, however measured or determined.
6. Fear of the federal ogre—SEC.
7. With respect to the small company, presumed inadequate capital to pursue equities aggressively in its own name.

8. Lack of definition of market objectives and product response to achieve them.
9. An emerging awareness on the part of stock companies that a shift to variable products might significantly reduce profits.

It may be of interest to comment on United Kingdom experience with the variable products.

In the United States the variable annuity was first marketed by PALIC in 1954. Marketing was suspended in 1959 in the wake of SEC problems. In the United Kingdom, the variable annuity was first marketed by the London and Manchester in 1957. A variable life insurance policy was first issued by London and Edinburgh in the same year. Thus, while the United States is still talking, the United Kingdom has accumulated over ten years' experience with variable life insurance as a viable product.

While some predict that variable life insurance will be a major product of the major companies, in the United Kingdom the larger companies have been entering the arena principally, it seems, as a defensive measure during the past several years. The smaller, newer companies and unit trusts (i.e., mutual funds) are still the major forces in the market. In 1967, 4 per cent of new annual premiums was on equity-linked products. In 1969, 15 per cent was equity linked—75 per cent of which was accounted for by four companies. It is predicted that in 1970 25 per cent of new annual premiums will be on equity-linked products.

Although several general types exist, individual plans differ substantially in details. For example:

1. *Amount invested in equities.*—The two most frequent forms state the amount of premium invested or the proportionate part of sum assured invested.
2. *Death benefit.*—These are three frequent benefits: (*a*) sum assured or value of units, if greater; (*b*) sum assured plus capital appreciation of units; and (*c*) sum assured plus value of units.

Almost always there is a guaranteed minimum death benefit. Guaranteed minimum maturity amount is frequently provided. Fixed-interest securities, common stocks, and real estate (property) are all used. In the United States one tends to think only of common stocks.

Both par and nonpar contracts are sold in the United Kingdom, with the typical par contract providing that dividend income accrues to the company (from which dividends can in part be paid) and capital appreciation accrues to the policyholder.

The variable life product should have the following characteristics:

1. Level premiums.
2. A substantial portion—or all—of the premium in the first year allocated to protection, thereby providing a source of adequate compensation to the salesman. Thereafter, an increasing proportion of the premium allocated to savings.
3. Minimum death benefit guarantees.
4. Minimum point of time maturity value guarantees.
5. Fund consisting of fixed-dollar securities, stocks, property, or a balanced combination thereof.
6. The packaging of the product will depend on regulatory and statutory constraints. The package may be through a single variable life insurance contract with guarantees or a combination of term insurance and shares in an equity fund. It will be written on both par and nonpar bases. If segregated accounts are permitted without the traditional investment restrictions, the product will be issued by the company, not through a subsidiary—unless tax or marketing considerations or SEC requirements force the reverse.

The industry is in the swirling maelstrom of variable annuities, mutual funds, and variable insurance. In the absence of certain guarantees, none of these products provide ideal response to consumer needs, because none directly achieve the goal of establishing an adequate and dependable vehicle for financial security, which, in the context of life insurance thinking, must provide a product whose benefits respond to the changing costs, or standards of living, not to the whimsical ups and downs of the stock market.

MR. STEWART G. NAGLER: For purposes of discussion it is convenient to classify variable insurance designs by a characteristic which I will call the "multiplier." In simple terms, this multiplier measures the amount of insurance which will be produced by a dollar of excess investment earnings. More precisely, it is the reciprocal of the reserve factor used for insurance amounts in excess of the initial face amount.

Under the classification of low-multiplier plans, I include designs where excess investment performance either increases the face amount of insurance dollar for dollar or is used to purchase paid-up insurance. On the other hand, I consider the New York Life plan as a high-multiplier plan. Also included in the high-multiplier category would be policies where the benefits and premiums are expressed in units and certain combinations of paid-up and term insurance.

Using these classifications, variable insurance designs should primarily be measured by how well they satisfy the protection needs of the policy-

holder. After all, variable life insurance really is just a new insurance product which attempts to cover an additional risk—inflation. As such, its main goal should be to provide protection in a number of ways.

First, such a policy should provide a death benefit in the early years which is not substantially less than the initial face amount. Since a minimum death benefit equal to the initial face amount of insurance will obviously cover this point, my remarks are limited to plans without such a guarantee. In this area, the low-multiplier plans seem to have their greatest advantage. Since policy reserves are small in the early years, such low-multiplier plans cannot produce great changes in the face amount of insurance. On the other hand, the high-multiplier plans seem to present too great a possibility of large benefit decreases.

While attempting to satisfy the above need, these policies should also be capable of providing protection against inflation. In other words, if investment expectations are realized, a design should be sufficiently responsive to investment performance that the face amount of insurance will rise at a rate which offsets inflationary price increases. On this point, the differences between high- and low-multiplier plans are exactly opposite to those in the preceding discussion. During the early policy years, it is necessary to have a high multiplier in order to produce changes in the face amount of insurance which are sufficiently large to offset inflation.

One possibility which might be considered to resolve the conflict in the above criteria is to use one plan when investment results are positive and another plan when they are negative. For example, one could use the New York Life approach as long as positive changes in the face amount of insurance were produced and the paid-up approach when negative investment performance was involved.

Another standard against which such products should be measured is that of stability. If we make the assumption that policyholders continually evaluate their insurance needs, then a variable life insurance policy should provide an amount of insurance which does not fluctuate widely from year to year. Especially in periods of temporary market fluctuations, such a policy should avoid "swinging with the market."

In this regard, variable life insurance offers some advantages which variable annuities do not. Since a variable annuity is a paid-up benefit, the same method of linking variations in benefits to investment performance is used by most companies. On the other hand, the numerous variable insurance-adjustment techniques available offer opportunities for the development of useful averaging methods.

In my discussion of the New York Life paper, I presented a very simple

averaging technique. To the extent possible, this method limits annual changes in the face amount of insurance to a specified percentage per year. In an example presented, which covers a whole life policy issued in 1915, this averaging process sharply reduced the number of benefit decreases which occurred in the period from 1915 to 1968. Whereas the New York Life method produced benefit decreases in twenty-one different years, this averaging technique applied to the New York Life method produced decreases in only seven years. In addition, this method produced benefit increases in every year from 1943 to 1968. I am quite sure that the application of more sophisticated averaging techniques would produce even greater improvements in benefit patterns.

CHAIRMAN FRASER: In our paper we made the assumption throughout that premiums would be paid annually in advance. In practice, of course, this is not the way it will be done. What we plan to do is to compute the face amount on a daily basis upon the assumption that a pro rata portion of the net premium paid for the premium period is moved into the separate account each day. In other words, 1/365th of a full year's net premium will be moved into the separate account each day. The premium actually paid, whether monthly, quarterly, semiannually, or annually will be paid to the general account and held there in the normal manner. In the case of a premium not paid when due we will simply keep moving the daily net premiums into the separate account until we receive notice that the policy has been terminated, which can be as much as ninety days after the due date. What this means, of course, is that we have moved money into the separate account that, as events turned out, should not have been moved into the separate account. We simply take the position in such a case that company money has been invested in the separate account rather than in the general account and that nothing has been lost.

The SEC has agreed to meet with the industry and discuss its views regarding the question of variable life insurance. As of the moment, the SEC has taken no position on this matter. We feel it is very important to be exempted from any SEC requirements regarding the level of loading. Life insurance is a much different product from annuities, and it is not possible for us to live with investment-type loading on life insurance policies.

MR. RUDD: If the life insurance is being sold on the usual needs basis, it would appear desirable that there be a minimum guaranteed death benefit.

The guidelines of the federal superintendent of insurance do not permit cash values to be guaranteed and permit a guarantee on a maturity value only to the extent of the sum of the gross premiums. A guarantee on maturity benefit is found in some of the envelope-type plans. There is a further twist in that, if there is a death benefit minimum guarantee such as that under the envelope plans and some of the reserve-invested plans, or a maturity value guarantee, the insurer must include the assets of its segregated fund with respect to such contracts with its regular assets when testing to ensure that it still meets the federal requirement that not more than 25 per cent of its assets is invested in equities. This may be a deterrent to small or new companies from placing guarantees of any description in equity contracts that they plan to be their main line of business. The "package" type would perhaps be preferable.

MR. NAGLER: On the question of minimum guarantees, I will briefly express my opinion rather than speculate on what guarantees might emerge. Minimum face-amount guarantees seem desirable. If the costs involved are reasonable, these guarantees should extend for the life of the policy. Otherwise, I believe that a guarantee for a period of years, such as to age 65, should be used.

Minimum surrender value guarantees do not appeal to me. Such guarantees do not appear necessary to satisfy the basic insurance needs of the variable life insurance product. Considerations of equity are well satisfied if an individual receives as a cash-surrender value an amount reasonably related to his reserves.

CHAIRMAN FRASER: We feel that a guarantee that the amount paid on death under a variable life insurance policy will never be less than the initial face amount is a very desirable feature that can be supplied at a minimal cost provided it does not extend to the cash values. The reason the cost of this is minimal is that, under any reasonable long-term assumption as to the performance of the separate account, the face amount soon rises to such a level that even fluctuations in the market cannot bring it below the initial face amount. During the early years, when it may fluctuate below the initial face amount, the rate of mortality is relatively light. It is for this reason that the cost of this minimum guarantee is as small as it is.

MR. BOWLES: Has anyone looked at what the buyer wants? Someone in the audience said that we are kidding ourselves if we think the buyer

will spend money to fight inflation. He will spend money for a piece of the action. Someone else in the audience said that he felt it was not proper to say that life insurance is sold because of need and equity products because of greed.

MR. RUDD: We have been selling variable insurance for only two and a half months, and regular life insurance sales are up. There does not yet appear to be a substitution effect.

For a Canadian company doing business only in Canada, question 2 is academic; we cannot own a subsidiary life insurance company although we could own a mutual fund company. Because of the long period of time necessary to reach profitability, I suspect that it might be more advantageous to have the tax losses in the parent company.

CHAIRMAN FRASER: Since no one on the panel has given the arguments in favor of having a subsidiary, I will give some of these arguments, even though I do not favor having a subsidiary.

First, if you are one of the people that believe that variable life insurance should be issued on a nonparticipating basis and you happen to be with a domestic New York mutual life insurance company, you have to be in favor of issuing such insurance through a subsidiary, since the new New York law will not permit a domestic mutual company to issue nonparticipating variable life insurance.

The argument has been set forth that the use of a subsidiary will help to protect the company's fixed-dollar business from the SEC. I think the companies' experiences with variable annuities have indicated that this is not a problem. The SEC does not appear to be interested in fixed-dollar contracts.

Another argument that can be used in support of a subsidiary is that the variable contracts are less associated with the parent company in the policyholder's mind. This, of course, can also be a bad rather than a good thing. It all depends on your point of view.

One of the strong reasons advanced for having a subsidiary is that there might be some tax advantages if the Internal Revenue Service permits separate tax filings. Separate filings will be permitted provided it can be established that there is a good business reason for having a subsidiary and it is not simply a tax dodge.

The arguments against having a subsidiary appear to be primarily administrative. The use of a subsidiary is a very complicated thing and can

lead to a lot of problems. Also, some states have seasoning requirements for a new company that could cause considerable delay in the establishing of a subsidiary.

MR. RUDD: In reference to question 3, since the investment element is obviously participating, on any type of blended contract, such as the reserve invested type, it seems to make sense to have the policy participating. When there is decreasing term insurance, however, nonpar is appropriate. Expense charges are to some degree often participating, since they may be varied by the insurer within certain maximums. On our type of contract, we consider it an advantage to have regular dividends payable from nonequity sources to provide a cushion to maintain protection in poor or adverse markets. By investing the reserves from dividend-purchased insurance in the fund, we leverage performance toward the later durations when the effect on death benefit is smaller because of the larger single premiums for paid-up insurance.

MR. NAGLER: It is my belief that any company which issues fixed-dollar insurance on a participating basis should also issue variable life insurance on the same basis. Although variable life insurance represents a substantial departure from our traditional products, the differences do not seem sufficient to require a change in company philosophy. If this product is as successful as some people think it will be, then a decision to issue nonparticipating variable life insurance could easily change a company's character over a period of years.

Also, because of the lack of traditional excess interest margins, a company might wish to be conservative in setting its mortality and expense assumptions as well as its charge for guarantees. Should these assumptions actually turn out to be conservative, it seems that policyholders should receive the excess in the form of dividends.

Finally, by using the same approach for both fixed and variable insurance, it would be easier to issue a policy which is partially fixed and partially variable. Whether or not the variable portion of such a contract generates a substantial dividend, it might be difficult to justify having part of a policy participating and part nonparticipating.

CHAIRMAN FRASER: On the question of participating versus non-participating there are, of course, the same basic arguments for each as for fixed-dollar policies. In general those that favor participating fixed-dollar insurance will favor participating variable insurance and vice versa.

There are, however, some special points to be considered in the case of variable insurance that are not present in the case of fixed-dollar insurance. First of all, there is no interest element in the dividend for a participating variable life insurance policy, so that in general the level of dividends will tend to be lower. An offsetting factor here is that the dividend per thousand of initial face amount under a variable life insurance policy can get quite large if the face amount rises sharply, because the mortality profits become much more significant than they are for a fixed-dollar policy. Nevertheless, the net effect of these factors will probably lead to a flatter dividend scale than is common for fixed-dollar policies.

Another point that is probably of considerable significance is that the premium level used on fixed-dollar participating policies can be carried over at about the same level to participating variable policies. This would not be true for nonparticipating policies because the mortality profits that are used to pay expenses on nonparticipating policies will be dependent on the investment performance of the separate account, which will be hard to predict. Consequently, it appears that premiums for nonparticipating variable life insurance will probably have to be higher than those for nonparticipating fixed-dollar life insurance. The effect will probably be to narrow the gap that now exists on fixed-dollar insurance between participating and nonparticipating premiums.

Another point that might be made is that, if you are issuing participating fixed-dollar policies and wish to issue nonparticipating variable policies, you can really get into trouble if you would like to issue a combined contract that contains both fixed and variable elements.

It has been stated as an argument against participating variable life insurance that it will be difficult to handle dividend illustrations. I do not believe that this is necessarily so. There is no reason why dividend illustrations cannot be shown, based on the assumption that the separate account earnings are at the assumed interest rate. As a matter of fact, dividend illustrations could be shown on any other assumption also. Of course, any dividend illustrations would have to fall within the rules set forth by the regulatory authorities.

MR. BOWLES: Why should the shareholders not get some profit from a separate account?

MR. RUDD: We do not feel that shareholders have any entitlement to a share in the profits (or losses) of the equity fund being paid as dividends

since the risk is being borne by the policyowner. The management fee is the conventional method of remuneration to companies providing financial services in this fashion.

In response to question 4, training of agents and meeting regulatory guidelines are the major problems. The Canadian practice of a coupon off a factual "information folder" signed by the applicant would be well adopted even if jurisdictional authorities did not so require.

We are all familiar with the type of projections and implications made by mutual fund salesmen. The Canadian system of the filing of the proposal forms to be used—and only they are to be used—is designed to minimize this feature. The guidelines permit projections on up to a $7\frac{1}{2}$ per cent basis, or to 10 per cent if a correspondingly lower rate is also shown. We show 4, 7, and 10 per cent.

If you have an identical regular plan except for the equity feature, the agent can program, determine the need, and so forth, using it, and leave the question of equity until the end.

We were fortunate perhaps in introducing our contract (last March) during a falling stock market. Due perhaps to the nature of the contract, sales seem to be unaffected by the current gyrations. However, the current market experience has undoubtedly prevented some colorful verbal supplements to the very limited written material which may be presented. Our information folder gives projections of death benefits and surrender values for quinquennial issue ages to ensure that the prospective policyowner has a set of correct projections. Some companies incorporate agents' projections into the master application for checking at the head office.

CHAIRMAN FRASER: The New York Life policy has been criticized on the grounds that it is more difficult to tell the policyholder how his face amount varies than it is for some of the other designs. I agree that it is difficult, but I sincerely question whether any of the other designs are simple enough to get across to the policyholder either. I think that the way in which variable life insurance is going to be sold is on the basis of illustrations. After all, nobody asks how we get our dividends today under fixed-dollar insurance. Once we cross the bridge, under the New York Life design, of getting the policyholder to accept the face amount, we are in good shape, because from that point on practically everything is exactly like a fixed-dollar life insurance policy.

As of the moment we see no reason why we must have any different commissions on variable life insurance than we have on fixed-dollar life insurance. This, of course, is subject to what happens with the SEC.

As I indicated earlier, the lack of an interest margin in the dividends for a variable life insurance policy is going to mean that dividends will normally be lower.

MR. RUDD: In Canada the current status of laws and regulations is such that we are still operating under the guidelines of the provincial superintendents of insurance, which deal with policy and information folder (the short form of a prospectus) and other matters dealing with policyowner-insurer relations. The guidelines of the federal superintendent of insurance are aimed at solvency problems and restrictions on guarantees. Copies of current guidelines can be obtained from the Canadian Life Insurance Association. However, the securities commissions of the provinces (we have no federal equivalent of the SEC) are also claiming jurisdiction, starting last fall in Manitoba on a variable annuity contract and in Ontario on all equity contracts, and other provinces such as Quebec are interested. What happens in Ontario will presumably have a great effect on other provinces. Both the Ontario Securities Commission and the superintendent of insurance report to the same cabinet minister, and we are awaiting the results of this intragovernmental jurisdictional battle. The situation could end up worse than it is in the United States if we have to deal with the federal superintendent of insurance, all provincial superintendents of insurance, and all the provincial securities commissions, which are a long way from the uniform approach to problems which has characterized regulation of life insurance in Canada for many years.

CHAIRMAN FRASER: I will cover the legislative situation as it exists in the United States to supplement what Bill Rudd has said regarding Canada.

An enormous amount of progress has been made in the legislative area in the past year. The situation today stands as follows:

a) The issuance of some types of variable life insurance is possible under the present laws of about twenty states. However, in some of these states, there are general provisions of the insurance code which, if they remain applicable, could make issuance of such a contract difficult or impractical.

b) Last December, the NAIC adopted a model bill and a model regulation which would specifically authorize the issuance of a broad range of variable life insurance products and include the special treatment necessary in some areas where requirements and provisions that are used in connection with fixed-benefit policies need some modification for variable benefit policies. Several states have already passed laws or have pending legislation based on this model bill.

c) At the 1970 session of the New York State legislature, a statute was enacted which, like the NAIC model bill, specifically authorizes the issuance of variable life insurance products and appropriately recognizes the special nature of some of the requirements for such policies. The effective date of New York's legislation is January 1, 1971.

d) The SEC has agreed to meet on the subject of variable life insurance with an industry task force that has recently been formed.

It will certainly be several years before variable life insurance products can be offered on anything close to an across-the-board basis in all states. Nevertheless, the pace of progress has been encouragingly swift.

MODELS AND DECISION TECHNIQUES

1. Corporate models for large life insurance companies.
   a) Problems involved in constructing corporate models.
   b) Insights gained from constructing and using corporate models.
2. Techniques for finding approximate solutions to insurance management games and the relevance of these techniques in the real business world.
3. Decision-analysis procedures for making rational decisions on the degree of participation in large property insurance risks.
4. Decision-analysis models for deciding whether to purchase insurance classification information.

MR. JOHN C. FRASER: I shall describe the work that is going on at the New York Life Insurance Company in the construction of our corporate model.

There are many different ways that a life insurance company can approach the construction of a corporate model, and from my talks with others in the life insurance industry it appears that many approaches different from ours have been tried. Some companies have approached the problem from outside the operating departments by assigning the corporate planning department the job of constructing the corporate model. While this approach has the advantage of objectivity and has been widely used in other industries, I am not persuaded that it is appropriate in the case of life insurance companies with their extremely complex accounting.

In our case the corporate model was constructed by the same people that are responsible for the preparation of the company's gain and loss exhibit and for its surplus estimates and regular projections. This was due in large part to the process by which our corporate model evolved.

Early in 1957 it became apparent that our methods of estimating surplus for the current year, and for the balance of the five-year period for which the company has been regularly making projections, needed to be improved. One of the primary problems was that when we missed an estimate we were unable to explain why the actual and estimated results differed. Anyone who has been involved in estimation work will probably agree that the explanation of differences is probably more important than the accuracy of the estimates themselves. As a result of this, we undertook a fairly extensive review of our methods of projecting the company's financial results and developed methods that insofar as possible followed the procedure actually used in preparing the company's gain and loss exhibit. Of course, we took considerable short cuts in many areas.

We were very successful with these revised methods of preparing

estimates. We were never again faced with the problem of not being able to explain why an actual figure differed from the estimate, and, believe it or not, we were actually able to improve the accuracy of our estimates as well. As a matter of fact, through sheer chance our estimates were hitting within an uncanny degree of accuracy that none of us really believed was possible. Fortunately, last year we were a bit off in our estimates. I say "fortunately" because we had projected a small operating loss for the company after dividends, and we finished the year with a small operating gain.

Three years ago we were asked on an informal basis to computerize our projections. Since that time we have been working very diligently in the designing of a computerized corporate model of the company. We were able to adapt to the computerized model a lot of the existing projection techniques that had been developed in the 1957 review. Of course, we did improve these methods where it was feasible. I feel very strongly that if this model had not been developed by the people who were familiar with the gain and loss exhibit and the projections we would not have made as much progress. I will concede that we may lack the objectivity of a corporate planning department, but we do have the background knowledge that is probably necessary for any kind of intelligent corporate model.

It should be apparent from my previous comments that the New York Life's gains from operations after deduction of dividends are running at virtually a zero level. It should be clear that under these conditions we cannot really tell in advance whether we are going to have a gain or a loss for the year. Our assets and liabilities are in the $10 billion range, so that, to get projected operating gains within an accuracy of $1 million, it would be necessary to estimate both assets and liabilities to an accuracy of one-hundredth of 1 per cent, both in the right direction. This type of accuracy cannot be obtained.

It becomes impossible in such a situation to talk about accuracy in the normal sense, since it is quite evident that, if by the term "accuracy" we mean the ability to predict a year's operating gains in advance, we will be subject to a high degree of possible error. In most businesses it is rather important and quite possible to come up with accurate predictions of the year's profits. In the case of a mutual life insurance company, however, this is neither important nor possible. If we suffer a $10,000,000 loss after dividends in one year, it is quite easy to make it up in the next, either by cutting dividends or, more likely, in this era of expanding profits, by not increasing dividends as much as normal. What is of primary importance to a mutual life insurance company is not the short-term year-to-year

fluctuations in profits but the long-term profit picture. What we are primarily interested in is whether, on the basis of reasonable assumptions on future interest earnings, mortality risks, and expenses as we now see them, our premiums and dividends are proper over the long term. We recognize, of course, that, while it would be nice to be able to make an absolute prediction of future profits, particularly for the coming year, our primary goal is to make an estimate of where the company is headed under present conditions.

We recognize, of course, that it is virtually impossible to predict future financial conditions. Neither you nor I nor anybody else knows what is going to happen to rates of mortality over the next twenty to fifty years or what is going to happen to interest rates and expense rates over even the next five years. The best the model can tell us is what will happen under a given set of assumed conditions. This can be, however, enormously valuable in telling us where we are headed.

Another factor to be taken into consideration in evaluating the results of the model is the type of assumptions as to the product that the company will be issuing. It is my personal opinion that the life insurance business is headed for a major change in its product line. For example, you know that the New York Life is very interested in variable life insurance. Quite evidently, if variable life insurance replaces traditional fixed-dollar insurance to any significant degree, the entire financial structure of the company will undergo a very fundamental change. A well-designed corporate model could investigate such changes in product design and determine their financial impact on the company.

Our corporate model consists of the thirty-seven submodels shown in Exhibit I. Each of these submodels is programmed for the IBM 1130 computer. Through disk storage the submodels are linked as shown in Exhibit I. For example, submodel 8, policy loans, receives input from the output of submodels 3 and 7, and its output is furnished as input to submodels 9, 30, and 31.

In addition, almost all the submodels also receive direct outside input by means of punched cards, and all models will produce printed output, which may be more or less extensive at the option of the operator. Obviously, when the submodel is being tested, the operator will generally call for more extensive printed output than usual.

The purpose of a mathematical model is to extract from the real world the essential factors that appear to influence the results that one is trying to study, so that alternative hypothetical results can be generated or results can be projected into the future. If the model is too simple, it may lead to a poor reproduction of the real world. If the model is too compli-

EXHIBIT I

INPUT AND OUTPUT LINKAGE OF SUBMODELS

1. SALES Input: none Output:2,4,14,15, 16,21,25	2. INFORCE Input: 1 Output: 3,6,7,9,12	3. RESERVES Input: 2 Output:4,6,7,8,9, 25,27,28,30,34,35	4. PREMIUMS AND COMMISSIONS Input: 1,3 Output:5,6,12,13, 25,26,27,28,30,31, 34,35,37	5. REINSURANCE RESERVES Input: 4 Output:7,27,30,34, 35	6. MISCELLANEOUS RESERVES Input: 2,3,4,18,20 Output:27,30,34,35, 36	7. DIVIDENDS Input: 2,3,5 Output:8,10,11,25, 27,28,30,31,34,35, 36	8. POLICY LOANS Input:3,7 Output: 9,30,31
9. INSURANCE BENEFITS Input: 2,3,8 Output:10,11,17, 27,28,34	10. SCI Input: 7,9 Output:11,25,27, 28,30,31,34,35,36	11. SCNI Input: 7,9,10 Output:12,13,17, 18,19,20,25,27, 28,30,31,34,35	12. DISABILITY Input: 2,4,11 Output:25,27,28, 30,31,34,35,37	13. ACCIDENTAL DEATH Input:4,11 Output:25,27,28, 30,31,34,35,37	14. INDIVIDUAL ANNUITY Input: 1 Output:25,26,27,28 30,31,34,35,36,37	15. AGENTS Input: 1 Output:16,25,26, 27,28,30,31,34,35	16. EMPLOYEES Input: 1,15 Output:25,27,28, 30,33,34,35,36
17. MISCELLANEOUS ORDINARY Input: 9,11 Output:25,27,28, 30,31,34,35	18. GROUP LIFE, HEALTH AND FRANCHISE Input: 11 Output:6,25,26,27 28,30,31,34,36,37	19. GROUP ANNUITY Input: 11 Output:25,26,27, 28,30,31,33,34, 36,37	20. EPP Input: 11 Output:6,25,26,27, 28,30,31,34,37	21. PREMIUMS AND COMMISSIONS, HEALTH Input: 1 Output:22,23,24, 25,26,27,28,30, 31,34,36,37	22. RESERVES, HEALTH Input: 21 Output: 25,26,27, 28,30,31,34,36, 37	23. BENEFITS, HEALTH Input: 21 Output:25,26,27,28 30,31,34,36,37	24. DIVIDENDS, HEALTH Input: 21 Output:25,26,27 28,30,31,34,36, 37
25. EXPENSES Input:1,3,4,7,10, 11,12,13,14,15, 16,17,18,19,20, 21,22,23,24 Output:26,27,28, 30,31,33,34	26. TAXES Input:4,14,15,18, 19,20,21,22,23,24, 25 Output:27,28,30, 31,33,34	27. GRADING BASE LIABILITIES Input:3,4,5,6,7, 9,10,11,12,13,14, 15,16,17,18,19, 20,21,22,23,24,25, 26 Output:30,31,33,37	28. NEW FUNDS Input:3,4,7,9,10, 11,12,13,14,15,16, 17,18,19,20,21,22, 23,24,25,26 Output:29,30,31, 34,36,37	29. MISCELLANEOUS CASH FLOW Input: 28 Output: 30,31,33	30. ASSETS AND FED. INCOME TAX Input:3,4,5,6,7,8, 10,11,12,13,14,15, 16,17,18,19,20,21, 22,23,24,25,26,27, 28,29, Output:31,32,33	31. ALLOCATION OF NII AND FIT Input:4,7,8,10,11, 12,13,14,15,17,18, 19,20,21,22,23,24, 25,26,27,28,29,30 Output: 34,37	32. MSVR Input: 30 Output: 33
33. LIABILITY PAGE Input:16,19,25, 26,27,29,30,32, 34 Output: none	34. GAIN AND LOSS Input:3,4,5,6,7, 9,10,11,12,13,14, 15,16,17,18,19,20, 21,22,23,24,25,26, 28,31 Output: 33,36,37	35. INCREASE IN RESERVES Input:3,4,5,6,7, 10,11,12,13,14,15, 16,17 Output: 36	36. GAINS BY SOURCE Input:6,7,10,14, 16,18,19,21,22,23, 24,28,34,35 Output: none	37. RECONCILIATION OF NEW FUNDS Input:4,12,13,14, 18,19,20,21,22,23, 24,27,28,31,34 Output: none			

cated, it may become as incomprehensible as the real world and one may not be able to see the forest for the trees. In addition, one must always keep in mind the data that are available and their limitations. We have tried to follow these principles in the design of our corporate model.

So that you can get an idea of our general approach, I will describe one of our thirty-seven submodels and how it was developed. The submodel I will describe is the first one shown in Exhibit I—the ordinary life sales submodel.

The New York Life's most important product line by far is its ordinary life insurance line of business. Last year, in 1969, our agents sold $5 billion of ordinary life insurance. Obviously, our corporate model had to begin with a mathematical model of our ordinary life sales, since all else— insurance in force, premium income, assets, reserves, surplus, operating gains, and so forth—flows from it.

The first question we had to ask was, "Where do these sales come from?" The obvious answer was that they come from our agents. Clearly, the amount of a year's sales depends on both the number of agents selling and the average amount sold per agent. It seemed apparent that the average amount sold per agent would depend upon how experienced he is, that is, it would depend upon the year in which he was appointed. To incorporate this fact into the submodel, we had to find some data that showed the number of agents by year of appointment and the amount of sales by each class. What we found was not perfect, but it was fairly good. We were able to obtain data by year of appointment on the number of regular full-time agents with the company on December 31 of each of the past five calendar years and the amount of insurance sold during that calendar year by each class.

We were missing data on the sales of part-time agents, brokers, and agents terminated during the year, but what we had was about 90 per cent of the total sales volume for the year. The decision we had to make regarding the missing 10 per cent was now critical, and how it was resolved gives some insight into the general approach we took to our corporate model.

The "missing" sales as a percentage of the known sales by year of appointment of the agent were as follows:

	Per Cent
1964	10.2
1965	9.9
1966	9.6
1967	9.2
1968	9.8

The missing percentage, which was the balancing item linking the model to the real world, appeared to be reasonably stable, with no clear trend either up or down, and as if it were projectable. We could have spent a great deal of time trying to scare up data on part-time agents, brokers, and terminating agents and then could have incorporated the production of these agents into the model, thereby complicating it considerably. Even then, we probably would have had a significant balancing item, since there are undoubtedly other differences between the data used in our model and the real-world sales figure that we were trying to reproduce, due to differences in reporting, errors, and who knows what else. The improvement, if it would have been an improvement, did not seem worth the time or effort, at least for the time being, and we decided to project the missing data as a percentage of the known data, $9\frac{1}{2}$ or 10 per cent—you pick it.

Having decided to dig no deeper into these missing sales for the time being, we then went on to develop the rest of the ordinary life sales submodel. The data indicated that a given class of agents tended to increase their production from one calendar year to the next, and it was possible to determine average percentage increases in average production per agent.

We also examined for a period of years the average persistency rates of agents from the beginning to the end of the calendar year. As one would expect, the persistency rates in the earlier years following appointment were considerably lower than those in the later years. From these data it was possible to obtain a scale of persistency rates by number of years since appointment.

We are also able to determine that the number of agents appointed in any calendar year was closely related to the number of recruiters, that is, the managers and assistant managers of our sales offices.

On the basis of these facts we constructed our ordinary life sales submodel. The first step is to make a manpower projection. This involves projecting both the number of agents and the number of agency men, our recruiters.

We found that virtually all our recruiters, that is, the managers and assistant managers of our sales offices, are originally appointed from the ranks of our agents. In particular, the great majority of them are appointed from the group of agents appointed in the three prior calendar years. The second column of Table 1 shows the projected number of such agents. In a moment I will explain how this column is obtained. The third column shows the number of appointments of recruiters that we projected. This was obtained by taking 5.6 per cent of the number of agents in

TABLE 1

Year (1)	Number of Agents Beg. of Year in 1st, 2d, and 3d Prior Classes (2)	Recruiters Appointed = 0.056(1) (3)	Recruiters Terminating = 0.142(4)PR (4)	Recruiters at End of Year = (4)PR + (2) − (3) (5)	Average No. of Recruiters = 1/2(4)PR + 1/2(4) (6)	No. of Agents Appointed = 7.02(5) (7)	Total No. of Agents (8)	Agents per Recruiter = (7)/(4) (9)
1969				602	588	4,079	7,908	13.1
1970	1,783	100	85	617	610	4,282	8,450	13.7
1971	1,943	109	88	638	628	4,409	8,864	13.9
1972	2,140	120	91	667	653	4,584	9,280	13.9
1973	2,298	129	95	701	684	4,802	9,709	13.9
1974	2,432	136	100	737	719	5,047	10,173	13.8
1975	2,532	142	105	774	756	5,307	10,657	13.8
1976	2,651	148	110	812	793	5,567	11,161	13.7
1977	2,785	156	115	853	833	5,848	11,687	13.7
1978	2,925	164	121	896	875	6,143	12,244	13.7
1979	3,071	172	127	941	919	6,451	12,826	13.6
1980	3,225	181	134	988	965	6,774	13,439	13.6
1981	3,386	190	140	1,038	1,013	7,111	14,080	13.6
1982	3,557	199	147	1,090	1,064	7,469	14,764	13.5
1983	3,735	209	155	1,144	1,117	7,841	15,478	13.5
1984	3,922	220	162	1,202	1,173	8,234	16,228	13.5
1985	4,119	231	171	1,262	1,232	8,649	17,027	13.5
1986	4,325	242	179	1,325	1,294	9,084	17,862	13.5
1987	4,541	254	188	1,391	1,358	9,533	18,735	13.5
1988	4,769	267	198	1,460	1,426	10,011	19,662	13.5
1989	5,008	280	207	1,533	1,497	10,509	20,629	13.5
1990	5,258	294	218	1,609	1,571	11,028	21,646	13.5

TABLE 2

NUMBER OF AGENTS APPOINTED
DURING 1973: 4,802

Year of Appointment	Agent Force	Average Production	Total Production
1913	1	133	133
1915	1	943	943
1916	1	197	197
1917	1	259	259
1918	2	252	504
1919	4	262	1,048
1920	6	487	2,922
1921	5	287	1,435
1922	5	394	1,970
1923	4	419	1,676
1924	6	529	3,174
1925	13	552	7,176
1926	13	450	5,850
1927	10	194	1,940
1928	16	524	8,384
1929	14	475	6,650
1930	18	509	9,162
1931	19	456	8,664
1932	19	558	10,602
1933	14	501	7,014
1934	20	721	14,420
1935	16	675	10,800
1936	16	688	11,008
1937	19	729	13,851
1938	21	760	15,960
1939	16	814	13,024
1940	12	846	10,152
1941	21	631	13,251
1942	18	2,751	49,518
1943	19	589	11,191
1944	30	537	16,110
1945	60	859	51,540
1946	87	882	76,734
1947	63	814	51,282
1948	56	834	46,704
1949	69	952	65,688
1950	70	885	61,950
1951	75	1,000	75,000
1952	76	848	64,448
1953	104	1,355	140,920
1954	177	976	172,752
1955	165	920	151,800
1956	174	1,002	174,348
1957	180	1,018	183,240
1958	186	1,003	186,558

TABLE 2—*Continued*

Year of Appointment	Agent Force	Average Production	Total Production
1959	169	1,044	176,436
1960	199	1,014	201,786
1961	160	1,005	160,800
1962	193	999	192,807
1963	241	957	230,637
1964	215	1,057	227,255
1965	224	976	218,624
1966	243	882	214,326
1967	301	853	256,753
1968	349	788	275,012
1969	421	770	324,170
1970	575	755	434,125
1971	759	747	566,973
1972	1,097	747	819,459
1973	2,641	234	617,994
Totals for active agents	9,709	....	6,679,109
Production of inactive agents, etc...	....	....	656,012
Grand total	....	....	7,335,121

column 2. The fourth column shows the number of recruiters terminating. This consists of those retiring or leaving the company as well as assistant managers that are returning to service as agents. The number of recruiters terminating was projected as 14.2 per cent of the number of recruiters at the end of the prior year. Column 5 shows how the recruiters appointed and the recruiters terminating build up to the number of recruiters at the end of each year. In column 6 we obtain the average number of recruiters for the calendar year, and in column 7 we determine the number of agents appointed. This was projected as 7.02 agents appointed per recruiter in force. Column 8 shows the total number of agents. This is obtained in another part of the submodel. Column 9 shows the number of agents per recruiter, obtained by dividing column 8 by column 5.

In Tables 2 and 3 we have shown for two selected years, 1973 and 1974, our projection of the number of agents in force at the end of each year. At the top of Table 2 you will note that the 4,802 agents appointed is the figure from Table 1. A persistency rate was applied to this number to obtain the 2,641 agents still around at the end of 1973 out of 4,802 agents appointed during that year. Table 2 also shows the agents still in force from the previous years of appointment. These were obtained by applying persistency rates to the number of agents in force at the beginning of the

TABLE 3

NUMBER OF AGENTS APPOINTED DURING 1974: 5,047

Year of Appointment	Agent Force	Average Production	Total Production
1915	1	940	940
1916	1	196	196
1917	1	258	258
1918	2	251	502
1919	4	261	1,044
1920	6	485	2,910
1921	5	286	1,430
1922	5	392	1,960
1923	3	417	1,251
1924	6	527	3,162
1925	12	561	6,732
1926	12	458	5,496
1927	9	198	1,782
1928	15	539	8,085
1929	13	488	6,344
1930	17	523	8,891
1931	18	469	8,442
1932	17	573	9,741
1933	13	515	6,695
1934	19	741	14,079
1935	15	694	10,410
1936	15	708	10,620
1937	18	757	13,626
1938	19	790	15,010
1939	15	846	12,690
1940	11	879	9,669
1941	19	655	12,445
1942	17	2,858	48,586
1943	18	612	11,016
1944	28	561	15,708
1945	57	897	51,129
1946	83	921	76,443
1947	60	850	51,000
1948	53	871	46,163
1949	65	994	64,610
1950	65	924	60,060
1951	70	1,044	73,080
1952	70	885	61,950
1953	97	1,415	137,255
1954	165	1,019	168,135
1955	162	976	158,112
1956	171	1,063	181,773
1957	176	1,079	189,904
1958	183	1,063	194,529
1959	165	1,107	182,655

TABLE 3—*Continued*

Year of Appointment	Agent Force	Average Production	Total Production
1960	195	1,074	209,430
1961	157	1,076	168,932
1962	189	1,069	202,041
1963	237	1,025	242,925
1964	204	1,143	233,172
1965	208	1,066	221,728
1966	226	972	219,672
1967	280	949	265,720
1968	318	868	276,024
1969	378	841	317,898
1970	478	816	390,048
1971	592	800	473,600
1972	790	792	625,680
1973	1,149	792	910,008
1974	2,776	248	688,448
Totals for active agents	10,173	. . . .	7,391,844
Production of inactive agents, etc.	. . . .	. . . .	721,541
Grand total	. . . .	. . . .	8,113,385

year. By referring to Tables 2 and 3 together, it can be seen how the number of agents progresses. For example, Tables 2 and 3 show that, at the end of 1973, 575 agents from the 1970 class were still in force. This had dwindled to 478 at the end of 1974.

Referring to Table 1, you can now see where we got the second column. The 2,432 agents shown for 1974 are found to correspond to the 2,431 shown in Table 2 for the years of appointment 1970, 1971, and 1972. Note that there is a rounding difference of 1. The reason is that the computer prints out only the number of agents to the nearest man, whereas the calculations are actually made to more places. You will note in column 8 of Table 1 that the 9,709 agents shown for 1973 is the same as the total agent force in Table 2.

Companies should look carefully at their sales manpower requirements. Last year we did a very involved study of this. We tested all sorts of assumptions as to rate of appointment of recruiters and rate of appointment of agents. Much to our surprise, we discovered that we were more seriously constrained in what we could do than one would have thought. We found that any radical departure from our rates of appointments of recruiters or of agents could very seriously unbalance our agency structure. For example, let us consider the effect of varying the 7.02 agents appointed per recruiter. If this rate were cut in half, it would very seriously

TABLE 4

Effect of Changing Number of Agents Appointed per Recruiter

Calendar Year	Recruiters Appointed	Average Number of Recruiters	Number of Agents Appointed	Total Number of Agents	Total Sales (in Millions)
1969 actual..	106	588	4,079	7,908	$ 4,964
4.0 Agents per Recruiter					
1970........	100	610	2,440	7,437	$ 5,204
1975........	78	619	2,476	7,442	6,867
1980........	73	573	2,292	7,391	9,189
1985........	68	531	2,124	7,224	12,006
1990........	63	493	1,972	6,933	15,319
5.0 Agents per Recruiter					
1970........	100	610	3,050	7,773	$ 5,283
1975........	99	664	3,320	8,434	7,528
1980........	103	691	3,455	9,061	10,829
1985........	108	720	3,600	9,646	15,388
1990........	112	749	3,745	10,175	21,639
6.0 Agents per Recruiter					
1970........	100	610	3,660	8,108	$ 5,361
1975........	120	710	4,260	9,499	8,226
1980........	139	821	4,926	11,056	12,745
1985........	161	951	5,706	12,840	19,720
1990........	186	1,100	6,600	14,886	30,506
7.02 Agents per Recruiter (Used)					
1970........	100	610	4,282	8,450	$ 5,441
1975........	142	756	5,307	10,657	8,976
1980........	181	965	6,774	13,439	14,986
1985........	231	1,232	8,649	17,027	25,255
1990........	294	1,571	11,028	21,646	42,860
8.0 Agents per Recruiter					
1970........	100	610	4,880	8,779	$ 5,517
1975........	163	802	6,416	11,848	9,737
1980........	227	1,115	8,920	16,105	17,452
1985........	316	1,551	12,408	22,114	31,841
1990........	439	2,160	17,280	30,598	58,801

TABLE 4—*Continued*

Calendar Year	Recruiters Appointed	Average Number of Recruiters	Number of Agents Appointed	Total Number of Agents	Total Sales (in Millions)
		9.0 Agents per Recruiter			
1970........	100	610	5,490	9,115	$ 5,596
1975........	186	849	7,641	13,129	10,543
1980........	280	1,280	11,520	19,225	20,292
1985........	423	1,935	17,415	28,593	40,061
1990........	639	2,924	26,316	42,921	80,284
		10.0 Agents per Recruiter			
1970........	100	610	6,100	9,450	$ 5,674
1975........	209	895	8,950	14,482	11,389
1980........	340	1,459	14,590	22,804	23,504
1985........	555	2,381	23,810	36,576	50,022
1990........	905	3,886	38,860	59,295	108,274

impair the compensation of our recruiters, since recruiting credits are one of the most important parts of the compensation of recruiters. To keep this compensation in line, it would be necessary to reduce very sharply the number of recruiters, thereby leaving our sales offices without proper management. On the other hand, a sharp increase in the number of agents appointed per recruiter would flood the sales offices with new and inexperienced agents and make it impossible for our agency management to deal effectively with them. Table 4 shows the effect of changing just the one parameter—number of agents appointed per recruiter. Note how sensitive the results are to changes in this parameter.

This type of study is not very complicated and is the sort of thing that any company can do fairly easily. It clearly indicates that any radical enlargement in the number of a company's sales offices can lead it into trouble because it cannot appoint and train its managers and assistant managers rapidly enough to keep up with the fast inflow in the number of agents that would have to be recruited in order to maintain the proper production level of the sales office. We were, of course, aware of these limitations in a qualitative way, but we were very surprised to discover how little we could deviate from our present agency structure without getting into trouble in one area or another. This is not to say, of course, that one should not seek to push toward the upper limit but it does indi-

cate that there is more constraint in what can be done in this area than one would normally think. The discovery of this fact alone has, in my opinion, justified the entire cost of developing our corporate model. It illustrates how enormous can be the savings or the avoidance of losses by the use of even the simplest of models.

I will now go on to explain how we obtain the sales projection from the manpower projection. Having obtained the number of agents by year of appointment, we then give the submodel the average production per agent as of the end of the prior year for each calendar year of appointment as well as the initial production for new agents. The model is also given factors to be applied to the average production figures as of the end of the prior year to obtain the average production figures at the end of the current year. These factors are applied, and the average production at the end of the current year is then multiplied by the number of agents at the end of the year, separately for each year of appointment, to obtain the total insurance sold by regular full-time agents with the company at the end of the calendar year. The submodel is also given the adjustment factor previously discussed, and it applies this factor to bring in the missing amounts sold by part-time agents, brokers, terminated agents, and the like.

Quite evidently, if our ordinary life sales submodel is given the actual input factors for any past calendar year rather than smoothed or projected factors, it will reproduce exactly, except for rounding, the actual sales volume for that year. The trick is to use the model to project into future years. A factor is considered to be projectable only if it exhibits stability. For example, the adjustment for part-time agents, brokers, and terminated agents was considered to be projectable only because it exhibited stability on the basis of the data for the past several years. If it had shown a trend either upward or downward, it would have indicated an important missing element in the submodel requiring investigation. As previously mentioned, this adjustment factor is really the balancing item that connects the theoretical model with the real world. It represents all the missing data that for simplicity we wish to avoid. If we went so far as to attempt to eliminate this adjustment factor entirely, we would end up making the model as complicated as the real world and would then lose the advantage of having the model. This is a very important point to keep in mind in the construction of corporate models.

This same general approach was taken with respect to each of the other thirty-six submodels. Each of these submodels contains at least one balancing item which permits it, if given the correct input information, to reproduce the actual results for any past calendar year of experience.

The criterion previously mentioned was applied to all these balancing items, namely, that it be stable enough to be projectable.

Although each of our thirty-seven submodels will reproduce the actual results for any actual calendar year if given the correct input information, either from outside the system or from the other submodels, we still have a considerable problem in making projections. The reason is that there can and will be inconsistencies in our projected input information to the various submodels. These inconsistencies do not exist in actual data by definition but can be a real problem in making projections. An example may help.

Our employee submodel receives as one item of outside input the number of new employees hired. This reflects someone's idea of how many new employees are needed to handle the increased work load and to replace terminating employees. This is obviously related in some way to the number of agents and sales produced by the ordinary life sales sub-model, but in what way we do not know because of the number of factors influencing the relationship, automation, education, and changing policy-holder-service requirements, just to mention a few. We can look at the past relationships, but they may tell us nothing for the future.

The consistency of projected information supplied from outside the system is very important if corporate financial results are to be properly projected. Some companies have attempted to deal with this problem through a regression linkage of data where the cause-and-effect relationship is not known. At the risk of offending many of you, I must say that in my view this is just a fancy mathematical way of avoiding the admission that you do not know what is going on.

In our corporate model we have deliberately retained control of the input factors outside the system and have avoided regression linkages. Quite obviously, this leads to an enormous amount of input data that can easily be projected inconsistently. We have retained control, however, and will be able to construct additional submodels to link input data in a logical manner. Each submodel is programmed to run for fifty years, not because we believe in fifty-year projections but because it permits us to spot inconsistencies in input data that are not obvious after five, ten, or even twenty years, but stand out dramatically after fifty years. As time goes by and our corporate model evolves, we will make more and more linkages between input data by constructing additional submodels. Sensitivity testing of the entire corporate model will tell us the most important linkages that still need to be made, and we will try to deal with these first. I suspect that twenty-five years from now our company model may consist of over one thousand submodels and that it will still not be satisfactory in the eyes of those using it.

MR. RICHARD L. MAURER:* In 1968 Russell Collins, Jr., and J. S. Hill [2] published a description of a series of mathematical models that approximated the operation of a life insurance company from a managerial point of view. These mathematical models were programmed for an electronic digital computer, and the result was an insurance management game. This game was intended to provide a reasonably realistic acquaintance with the methods and consequences of managerial decision making in life insurance.

It should be emphasized that Collins and Hill did not intend the game to be used as a decision-making tool by life insurance companies; rather, it was designed to be a tool for managerial training. Consequently, if the game was not in perfect correspondence with the real world, these deviations were not viewed as being fatal to the achievement of the objectives of the game.

The game as originally written by Collins and Hill was basically a model for the operation of a single insurance company. In each play or period of the game, a hypothetical six months, the company's decisions would be put into this model and the computer would print out the company's position at the end of the period in terms of various accounting statements. There were two major points in which the model was nonrealistic. The model was noncompetitive, because the results for any individual company depended only upon its own decisions. In addition, the game was completely deterministic. Such factors as mortality, amount of new business sold by the industry, and the rate of return on investments were each set at some average level in the game. Further modifications to correct this and more were undertaken by David Garrick Halmstad [4].

The game program is a mathematical model that produces accounting data on a number of individual life insurance companies as a function of various input decisions by these companies' managements and internally generated pseudo-random variables. Because of this randomness and the interaction of the companies' decisions, any attempt to find an optimum strategy for playing this game would result in an extremely complicated problem in game theory. However, with the random components fixed at their expected value and the decisions of all but one of the companies held constant, the game can be viewed as a system of difference equations, the results being uniquely determined by the decisions and the program.

In accordance with conventional business wisdom, it seems reasonable

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to measure the performance of the companies in the game in terms of the amount of insurance in force, surplus, and assets. Given the wealth of data available to each company, however, there are many possible measures of success. During one play of the game in New York by a group of actuarial students, one company's goal was to maximize home office salaries. We will assume, however, that success in insurance management can be measured by some function of insurance in force, surplus, and assets.

For the purpose of experimenting with methods for finding optimum decisions, a second computer program was written, in which there were two companies competing in a model in which each of the random components was fixed at its expected value. The decisions of one of these companies were held constant, that is, premiums, underwriting, commissions, and the rest were set at their initial levels. The second of the two teams was programmed to make a set of decisions, where each decision was chosen at random according to a uniform distribution of probability over a reasonable interval. These decisions were retained for the time period under consideration. In other words an experiment was designed to study the effect of decisions on the outcome of the game. The computer's ability to generate pseudo-random decisions was used in conducting the experiment.

A time horizon of twenty years, forty six-month periods, was chosen as being long enough for the various decisions to take their full effect and yet not so long as to use excessive amounts of computer time. After each twenty-year run the decisions and the amount of insurance in force, surplus, and assets for each team were punched on cards. Since it had been decided to make as few assumptions as possible about the game, a fairly large sample, 100, was taken. No use was made of the results achieved by the company that retained the original decisions.

The cards from the company making the random decisions were the input data to a stepwise regression computer program using the least-squared residual criteria [3] to yield three regression equations expressing insurance in force, surplus, and assets as linear functions of the decision variables. The decision variables are ordered by the program by the amount of reduction in the variance of the residuals from the regression surface obtained by adding a particular decision variable to the regression equation. The amount of reduction in the variance may by observed by exhibiting R^2, the square of the coefficient of multiple correlation. This quantity is the ratio of the variance of the residuals from the regression surface to the variance of the residuals from an initial mean where none of the decision variables help determine the mean.

Because of the nonlinearity of the underlying model and the interaction of the variables, both within and among the companies, there was some doubt of the ability of a function linear in eleven decision variables to predict the dependent variables insurance in force, surplus, and assets at the end of twenty years. If the regression equations had not accounted for a major portion of the variance, it would have been difficult to justify an approximate solution to the game based on these regressions.

In the first attempt to obtain the regression equations, the range for each decision variable was set broad enough that the effect of extreme decisions could be measured. After observing the residuals from the regression surfaces, there appeared to be several instances where the residuals could be reduced by restricting the intervals over which certain decisions would be allowed to range.

Several discrepancies between the conventional business wisdom and the results of the game were apparent in this regression analysis. One of these, a lack of effect of dividends on amount of insurance in force, had been noticed independently by Halmstad, and he made some changes to correct this. These changes were incorporated into the new program, and a final regression was made using the modified decision intervals. The results can be seen in Table 1. This regression accounted for even more of the variance than the earlier regressions did and indicated a greatly increased effect of dividends on the amount of insurance in force.

An important point is that it can be shown by the regressions that the changes had been effective in their intended purpose and to what extent. This experience indicates the power of the linear regression model in uncovering and correcting anomalies in the game. If the regression analysis discloses that a particular decision variable has greater or lesser impact than real-world business experience dictated, an alteration in the game is indicated.

It was decided to exclude from the regressions any decision variable that contributed a reduction of less than 0.001 to the variance of that regression. This meant, for example, that the amount of insurance in force was actually a function of the four decision variables—premium, dividends, goal for new agencies, and home office improvement—the rest being considered insignificant.

Linear programming is a mathematical technique to determine the allocation of resources to optimize a linear objective function subject to a system of linear constraints. A large body of computer techniques has been developed for the solution of linear programming problems. The linear programming computer program from the IBM 360 Mathematical Programming System [5] was used in all the solutions displayed.

TABLE 1

REGRESSION ANALYSIS OF GAME RESULTS

Decision Variable	R^2	Increase in R^2	Range of Decision
In Force			
Premium....................	0.6237	0.6237	$16.00–$24.00
Dividends..................	.9129	.2892	0.00–0.30
Goal for agencies...........	.9624	.0495	1–19
Home office improvement.....	.9700	.0076	$0–$100,000
Renewal commission........	.9707	.0007	0.03–0.08
1st-year commission..........	.9708	.0001	0.30–0.80
Underwriting...............	.9708	.0000	0.200–1.000
Retention limit.............	.9708	.0000	$10,000–$200,000
Agency training.............	.9708	.0000	$0–$50,000
Advertising................	.9708	.0000	$0–$250,000
Persistency bonus...........	0.9708	0.0000	0.00–1.00
Surplus			
Dividends..................	0.4866	0.4866	0.00–0.30
Premium....................	.7634	.2768	$16.00–$24.00
Goal for agencies...........	.8343	.0709	1–19
Agency training.............	.8782	.0439	$0–$50,000
1st-year commission..........	.9076	.0294	0.30–0.80
Persistency bonus............	.9128	.0052	0.00–1.00
Advertising................	.9149	.0021	$0–$250,000
Retention limit.............	.9162	.0013	$10,000–$200,000
Renewal commission........	.9170	.0008	0.03–0.08
Home office improvement.....	.9176	.0006	$0–$100,000
Underwriting...............	0.9180	0.0004	0.200–1.000
Assets			
Premium....................	0.5292	0.5292	$16.00–$24.00
Dividends..................	.7874	.2582	0.00–0.30
Agency training.............	.8378	.0504	$0–$50,000
1st-year commission..........	.8632	.0254	0.30–0.80
Home office improvement.....	.8906	.0274	$0–$100,000
Persistency bonus...........	.9000	.0094	0.00–1.00
Advertising................	.9029	.0029	$0–$250,000
Retention limit.............	.9051	.0022	$10,000–$200,000
Underwriting...............	.9073	.0022	0.200–1.000
Goal for agencies............	.9086	.0013	1–19
Renewal commission........	0.9089	0.0003	0.03–0.08

It has already been shown that the linear regression analysis provides estimates of the amount of insurance in force, surplus, and assets as linear functions of the decision variables. This implies that we can find the decisions necessary to maximize any linear mix of these three quantities by using linear programming.

Eleven constraints were used to insure that the optimum level for any decision variable would be within the range upon which the regression was based. These constraints are undoubtedly somewhat arbitrary, but in the real business world law, tradition, and existing contracts and commitments often establish corresponding restrictions. Another constraint, surplus ≥ 0, was used with all the solutions listed.

TABLE 2

VARIABLES FIXED AT THEIR MAXIMUM OR MINIMUM

Variable	Effects	Maximum or Minimum	Value
Underwriting	Assets	Min	0.200
Retention limit	Surplus, assets	Max	$200,000
Advertising	Surplus, assets	Min	$0
Agency training	Surplus, assets	Min	$0
Home office improvement	In force, assets	Max	$100,000
Persistency bonus	Surplus, assets	Min	0.0
1st-year commission	Surplus, assets	Min	0.30

When the nonzero coefficients in each of the three regressions for a particular decision variable are all of the same sign, the optimal level or amount of the decision is either its maximum or its minimum value, depending on the sign, regardless of the objective function. This occurred in seven of the eleven decision variables, which meant that we could detect no changes in the optimum level of these decision variables as the objective function was varied. The decisions so fixed and their levels or amounts, whether they are set at their maximum or minimum, and whether they affect the amount of insurance in force, surplus, or assets, are shown in Table 2. The decision variable renewal commissions appeared in none of the regressions with a reduction of variance of 0.001 or more, which implies that renewal commissions may be set arbitrarily between 0.03 and 0.08, with no discernible effect on the amount of insurance in force, surplus, or assets as predicted by the regression equations.

There seemed to be little in the insurance literature on the choice of an objective function for management. Collins-Hill and Halmstad avoid the problem in their suggestions for playing the game by having

each company choose its own goals and then attempt to find the decisions to achieve them.

Three obvious, and simple, goals would be to maximize the amount of insurance in force, surplus, and assets. The decisions and the projected results are shown as objectives 1, 2, and 3, respectively, in Table 3. The decisions are just what general reasoning would indicate. To maximize the amount of insurance in force, lower the premium and raise the dividends as far as possible and establish the largest agency force possible without going bankrupt. Maximizing surplus is exactly the opposite of maximizing amount of insurance in force, while maximizing assets requires the same decisions as in force except that the agency force is kept smaller.

TABLE 3

DECISIONS AND PROJECTED RESULTS (IN $1,000)
FOR SELECTED OBJECTIVES

Objec-tive*	Premium	Goal for Agencies	Divi-dends	In Force	Surplus	Assets
1......	$16.00	8	0.30	$6,785,751	$ 0	$1,271,021
2......	24.00	1	.00	2,017,697	451,367	865,731
3......	16.00	1	.30	6,478,691	41,375	1,276,011
4......	24.00	1	.13	2,883,260	352,427	947,091
5......	16.00	1	0.00	4,537,997	263,209	1,093,591

* Objective 1: Maximize in force, subject to the constraint surplus ≥ 0. Objective 2: Maximize surplus, subject to the constraint surplus ≥ 0. Objective 3: Maximize assets, subject to the constraint surplus ≥ 0. Objective 4: Maximize in force, subject to the constraints surplus ≥ 0; surplus ≥ 2 per cent of in force; and assets ≥ 33 per cent of in force. Objective 5: Maximize $3 \times in force/\$1,000 + 4$ per cent of surplus, subject to the constraints surplus ≥ 0; surplus ≥ 2 per cent of in force; assets ≥ 20 per cent of in force.

A somewhat more realistic approach can be gained by observation of actual insurance companies' positions in these three categories. Mutual life insurance companies which sell mostly individual insurance were chosen to be consistent with the game. From an examination of annual statements in *Best's Life Insurance Directory*, these companies were found on the average to have assets equal to about one-third of their insurance in force, surplus of about 2 per cent of in force, and surplus of about 6 per cent of assets. Since the amount of insurance in force seems to be a major consideration among life insurance companies, a reasonable goal might be to maximize the amount of insurance in force subject to the constraints surplus ≥ 2 per cent of insurance in force and assets $\geq$ one-third of insurance in force.

The decisions and projected results are shown in Table 3 as objective 4. The constraint on assets determines the maximum amount of insurance in force. The final proposed objective function is $Y \times$ in force $+ Z$ per cent of surplus. The reasoning behind this objective function is that each

dollar of insurance in force would produce on the average Y dollars per year as profit and in addition each dollar of surplus would earn interest at the company's average rate of return Z. According to Anderson [1], Y should be on the order of $3 per $1,000 of insurance in force, and consideration of the game indicated that Z was about 4 per cent. The constraints surplus ≥ 2 per cent of insurance in force and assets $\geq$ one-fifth of insurance in force were used. The one-fifth constraint seemed more in agreement with the game model than the one-third constraint used on assets in the previous problem. The decisions and the projected results are shown as objective 5 in Table 3.

According to the regression analysis the management game model for the amount of insurance in force has several results that seem to violate common sense. The total lack of effect of commissions is the most obvious, while agency training and advertising probably should have more effect. Much future research is needed to discover the effects of changes in the decision variables of the game in the real world.

A vast area for future research is the exploration of the value judgments of management in order to set more realistic objective functions. There appears to have been very little written on the definition of the goals of management. Even given definite goals for management, this report points out the extremely difficult problems faced by a real-world manager. The random and competitive components cannot be taken out of his game.

The methods used in this report to obtain approximate solutions for the Collins-Hill-Halmstad game—regression and linear programming—can be used to explore the real business world. Suitable data for this type of project would be limited. In this report we could hold constant the entire life insurance industry, except for the company under consideration, for a long length of time. The random fluctuations of the economy, mortality, and even the disposition of the insurance-buying world could be fixed. In reality, of course, few of these factors could be expected to remain stable for any appreciable period. Even with these drawbacks, interaction between management, the game, and the real world can result in a greater understanding of all these on the part of management.

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MR. CHARLES C. HEWITT, JR.:* Imagine that you are the manager of a small branch office of a large company or that you are the general manager of a small company. For reasons peculiar to your own outlook (or that of your company) you do not desire under any circumstances to lose more than $2½ million (or numerics as they are indicated in the accompanying material). Furthermore your estimate of the worth of money in the neighborhood of zero, that is, neither gain nor loss, is linear—to paraphrase Gertrude Stein, "A dollar is a dollar is a dollar."

Then, whether you are aware of it or not, you have a utility function very much like the one shown in Figure 1—a freehand sketch determined by the conditions set forth in the preceding paragraph. The curve is linear near the origin, then decreases more rapidly as possible loss increases until it approaches the abscissa of 2½ million numerics asymptotically. Since the ordinates of this figure represent the utility values which you place upon certain values of numerics, we shall call the units "utiles," for lack of a better name. Figure 1 may then be said to represent a manager's utility function.

Translating Figure 1 into tabular form for future reference purposes, we see that a gain of 20,000 numerics has a utility value of 20,000 utiles, "neither loss nor gain" has no utility value, a loss of 100,000 numerics has a −110,000 utile equivalent, and so forth. At the lower end of Table 1 we see that a 2 million numeric loss equals a 5 million utile loss, and, by the conditions of our manager's utility function, a 2½ million numeric loss has a value of negative infinity utiles.

To the extent that Table 1 does not precisely track with Figure 1, it is probably the fault of the author's freehand sketching, because the graph was designed to produce the table.

Let us assume that one of your duties, as a manager, is the acceptance, or rejection, of large property lines, such as fire insurance on an oil refin-

* Mr. Hewitt, F.C.A.S., is Actuary of Allstate Insurance Company.
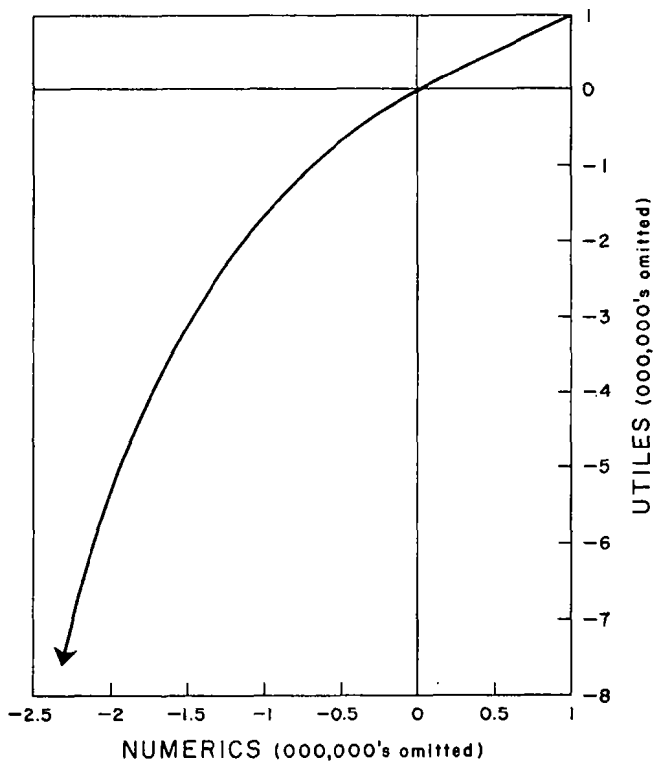
FIG. 1.—Manager's utility function

TABLE 1

MANAGER'S UTILITY FUNCTION

Numerics	Utiles
20,000	20,000
10,000	10,000
0	0
— 100,000	— 110,000
— 200,000	— 230,000
— 500,000	— 650,000
— 700,000	— 950,000
−1,000,000	−1,500,000
−1,500,000	−3,000,000
−2,000,000	−5,000,000
−2,500,000	— ∞

ery, a large furniture warehouse, or a department store. The custom of
the business is that a broker will present to you various offerings upon
which you can act by accepting some pro rata portion of the risk in return
for which you will receive the same portion of the total premium (less
brokerage and other commissions). The broker identifies all the salient
facts surrounding the risk, including the rate to be charged; normally
such lines are not subject to state rating laws requiring prior approval or
even any approval.

We are now ready to consider our first submission from a broker; call
the submission "A." As indicated in Table 2, the full risk has a face
amount of 1 million numerics, for which a gross premium of 20,000
numerics will be paid by the insured. Commissions to the broker and

TABLE 2

FIRST SUBMISSION (A)

	Numerics
Amount of insurance..........	1,000,000
Premium—gross.............	20,000
Premium—net..............	14,000
No partial loss is possible.	
Probability of a loss (total) (Event A)=0.01.	
Pure loss cost...............	10,000
Expected profit.............	4,000
Manager can accept 100, 50, or 10 per cent.	

other expenses will account for 30 per cent of the gross premium, leav-
ing 14,000 numerics to be divided among the accepting insurers on a
pro rata basis. For simplicity we shall postulate that no partial loss is
possible—a totally unrealistic assumption but necessary here in order to
keep the discussion clear—and that the probability of a loss is 0.01. The
occurrence of such a loss (total) will be referred to as "Event A." Thus
the pure loss cost for this risk is $0.01 \times 1,000,000$ numerics $= 10,000$
numerics, and the expected profit is 14,000 (net premium) $- 10,000$
(loss cost) $= 4,000$ numerics.

We are told by the broker that we may accept 100, 50, or 10 per cent
of the risk, if we accept it all. Since the risk should produce an expecta-
tion of profit, at least in numerics, we will want to accept some portion.
But how much?

To analyze the basis for making our decision, we shall set forth the
possible outcomes in tabular form. The pattern for each of the three
alternatives is the same, so we shall discuss that for a 50 per cent accept-
ance.

The two possible events are "loss" and "no loss." In the latter instance we shall retain the accepted net premium as our gain, so this event is labeled "net premium."

From Table 1 and the knowledge that utility values are linear between zero and 20,000 numerics, we can see that a loss would have a utility value of −650,000 utiles (tabular equivalent of −500,000 numerics) and that the net premium would have a value of 7,000 utiles. As the footnote to Table 3 indicates, we have made another simplifying assumption—

TABLE 3

FIRST DECISION

Acceptance (A)	Event	Numerics*	Utiles	Prob- ability*	Expected Utiles
100%	Loss Net premium	−1,000,000 + 14,000	−1,500,000 + 14,000	0.01 1	−15,000 +14,000
Balance.	. . . .	. . . .	. . . .	. . . .	− 1,000
50%	Loss Net premium	− 500,000 + 7,000	− 650,000 + 7,000	0.01 1	− 6,500 + 7,000
Balance.	. . . .	. . . .	. . . .	. . . .	+ 500
10%	Loss Net premium	− 100,000 + 1,400	− 110,000 + 1,400	0.01 1	− 1,100 + 1,400
Balance.	. . . .	. . . .	. . . .	. . . .	+ 300

* To be strictly accurate, the loss should be reduced by the amount of net premium, and probability of net premium (no loss) should be less than unity. But this gives horrible numbers!

we have not reduced the amount of the loss by the amount of the net premium, but this would have made for horrible numbers. As partial offset we shall assume that the probability of retaining the net premium is unity, when, in fact, it should be 0.99.

Since the probability of a loss (Event A) is 0.01, the expected utility value of a loss is $0.01 \times −650,000$ utiles $= −6,500$ utiles; similarly the utility value of the net premium is 1 (probability of net premium) $\times$ 7,000 utiles $= 7,000$ utiles, so the expected utility of accepting 50 per cent of the first submission is $7,000 − 6,500 = +500$ utiles.

The other expected utility values, computed in a similar manner, are less than +500 utiles. Therefore we decide to accept 50 per cent of Submission A (Table 2), since this decision maximizes the utility value.

Submission B is very much like Submission A, except that everything is doubled. We assume that the occurrence of a loss (total) on this risk—Event B—is independent of Event A.

Again we are told by the broker that we can accept 100, 50, or 10 per cent of the risk.

There is no point in considering 100 per cent acceptance now, because we already risk a 500,000 numeric loss under Submission A; this plus a 2 million loss on Submission B, if we accepted 100 per cent, would have a utility value of negative infinity. So we consider only 50 per cent and 10 per cent acceptances as our alternatives. First, try 50 per cent acceptance.

TABLE 4

SECOND SUBMISSION (B)

	Numerics
Amount of insurance..........	2,000,000
Premium—gross..............	40,000
Premium—net..............	28,000
No partial loss is possible.	
Probability of a loss (total) (Event B)=0.01 (independent of Event A).	
Pure loss cost...............	20,000
Expected profit.............	8,000
Manager can accept 100, 50, or 10 per cent.	

TABLE 5

SECOND DECISION

Acceptance (B)	Event	Numerics*	Utiles	Probability*	Expected Utiles
50%....	A ∩ B	−1,500,000	−3,000,000	0.0001	− 300
	Ā ∩ B	−1,000,000	−1,500,000	0.0099	−14,850
	A ∩ B̄	− 500,000	− 650,000	0.0099	− 6,435
	Net premium	+ 21,000	+ 21,000	1	+21,000
Balance	....	....	....	....	− 585
Increment	....	....	....	....	− 1,085
10%....	A ∩ B	− 700,000	− 950,000	0.0001	− 95
	Ā ∩ B	− 200,000	− 230,000	0.0099	− 2,277
	A ∩ B̄	− 500,000	− 650,000	0.0099	− 6,435
	Net premium	+ 9,800	+ 9,800	1	+ 9,800
Balance	....	....	....	....	+ 993
Increment	....	....	....	....	+ 493

* See footnote to Table 3.

The decision format is basically similar to that already explained, except that we must now consider the compounding of Events A and B. The first compound event shown (*read as* A "cap" B or A intersection B) is that both Event A and Event B occur during the time period under consideration. If this compound event occurs, our numeric loss would be 1,500,000 (500,000 from A and 50 per cent of 2,000,000 from B). Such loss would have a utility value of −3 million utiles, the probability of both A and B occurring is 0.0001, and therefore the expected utiles are −300. The other possibilities may be computed in similar fashion, leading to an expected utility of −585 from the combined acceptances.

TABLE 6

RESUBMISSION OF B

(With Gross Premium of 50,000 Numerics and
Net Premium of 35,000 Numerics)

ITEM	EXPECTED UTILES	
	50 Per Cent Acceptance	10 Per Cent Acceptance
Net premium..........	+24,500	+10,500
Balance...............	+ 2,915	+ 1,693
Increment.............	+ 2,415	+ 1,193

But we already had an expectation of +500 utiles from the decision already made. So the incremental value of accepting 50 per cent of Submission B is −1,085 utiles. Since this is less than the incremental value of accepting 10 per cent, we would choose to accept the latter.

Notice here that we must consider the effect of any previously made decisions and also how complex the calculations of subsequent decisions can become.

Finally, before discussing the manner in which this method of decision analysis may be applied in practice, it is instructive to see how a change in the parameters may affect our decision.

Let us suppose for the sake of discussion that the broker on Submission B has no luck in placing the risk—not because the risk expectation is not profitable but because the market capacity is limited. So he returns to the risk and suggests that they "up the ante" to 50,000 numerics from 40,000 numerics. If a 70 per cent expense ratio is used, this would leave a net

premium of 35,000 numerics as opposed to a pure loss cost of 20,000 numerics.

For a 50 per cent acceptance we would now have a combined net premium of 24,500 numerics (7,000 from A and 50 per cent of 35,000 from B). The loss conditions surrounding the risk remain unchanged and our new balance for a 50 per cent acceptance is +2,915, or an increment of 2,415 utiles, since we expected +500 utiles when we took 50 per cent of A. This is better than taking 10 per cent of Submission B, so we may conclude that "sweetening the pot" on B will increase acceptance of the risk—a conclusion not unfamiliar to the professionals in this business.

This technique is under consideration as a possible device to encourage managers of smaller offices to accept a share of large property lines. In conjunction with an intracompany reinsurance program it can make possible the acceptance of 100 per cent of a desirable line with the retention by the accepting branch office of their desired pro rata share and cession of the balance to an intracompany pool. If the intracompany pool could not retain the entire cession from the branch office, this method would provide for determination by the pool as to what pro rata share of the cession it might accept and thus what portion it would, in turn, cede to reinsurers outside the company.

The mechanics of the program, in broad outline, are as follows:

1. The underwriter in the branch office would have a terminal in the branch through which he had access to the company computer. His input would be four or five parameters, such as amount of insurance, net premium, probable maximum loss, etc., from which the computer would be programmed to make a decision much in the manner shown above.

Of course, we would have previously stored in the computer memory the manager's utility function for each branch office, a record of previous acceptances, and a means of recognizing partial losses (which the examples used herein do not contemplate).

2. The computer would accept the input from the branch underwriter and in a matter of seconds reply with a recommendation as to his percentage acceptance.

3. The underwriter need not follow the computer's recommendation blindly but would be guided by the output of this program. Eventually he would advise the computer of the percentage acceptance, and this information would be added to the record of previous decisions, which, as we have seen, will have a definite bearing upon future decisions.

4. If this is used in conjunction with an intracompany reinsurance pool, the

computer would apply a corporate utility function to the portion of the risk not retained by the branch office to determine whether or not it would be necessary to "lay off" some portion of the cession from the branch.

It is hardly necessary to point out that this approach would be impossible without use of the computer because of the complexity of (a) partial loss recognition; (b) multiple decision recognition, past and present; (c) stored utility functions of more than one manager, as well as the corporation; and (d) storage of previous acceptances, erasing them from memory as they expire.

MR. DONALD A. JONES: In his excellent monograph, *Decision Analysis*, Howard Raiffa illustrates the fundamentals of decision making by discussing a textbook style "ball and urn" situation which he calls "Your Basic Problem." After setting the situation, he writes as follows: "Finally I should like to say a word in defense of our hypothetical and somewhat academic urn problem. . . . Furthermore, as an extra (and quite significant) dividend, we shall find that when many (of these) real problems are formulated mathematically, they turn out to be structurally similar to our idealized urn problem or variations thereof." Our purpose is to illustrate Raiffa's methodology on a simplified life insurance issue problem which is "structurally similar" to his urn problem.

Consider a home office life underwriter who wants to set rules for requesting inspection reports. For all applicants of the same sex, age, and plan and who show nothing derogatory on their applications, the underwriter will want to vary the type of inspection report to be requested, if any, by the amount of insurance applied for, denoted here in thousands by M. That is, for each M, the underwriter's decision problem is mathematically like Raiffa's urn problem. Thus this outline aims at solving a family of such problems indexed by M. In this analysis of the underwriter's decision problem it is assumed that he has complete authority (i.e., it is not a committee decision; *see* Raiffa, chap. viii) and that he seeks to maximize the company's *E*xpected *M*onetary *V*alue (EMV; *see* Raiffa, chap. iv).

THE MODEL

The elements of the general decision model are states, actions, payoffs, and experimental data. When some of these are random variables, the adjective "statistical" is usually inserted before "decision."

The underwriter's problem requires a statistical decision model with the following elements:

States.—The mortality classes into which applicants would be divided if complete underwriting information were available:

θ_1: Standard

θ_2: Substandard

θ_3: Sub-substandard

Actions.—Types of policies which can be offered at the end of the underwriting process:

a_0: Return application (do not play)

a_1: Offer standard

a_2: Offer substandard

a_3: Offer sub-substandard

Payoffs.—For an individual applicant the payoff is a random variable and its probability distribution depends upon the applicant's rating class and the underwriter's action. Since we are assuming that the underwriter considers the

TABLE 1

PAYOFF EMV'S

STATES	ACTIONS		
	a_1	a_2	a_3
θ_1............	20 M	-50	-50
θ_2............	13 M	20 M	-50
θ_3............	3 M	10 M	20 M

EMV, this uncertain payoff may be replaced by a certain payoff equal to its expected monetary value. Table 1 gives the EMV of the random payoff for each combination of rating class and underwriter action. The "-50" EMV is to represent the costs of offering a policy which is not taken due to an incorrect substandard classification; it is not the payoff which might have been. The $K \cdot M$ EMV's are the expected profits on an issued policy, where K is the expected profit per \$1,000 of insurance and M is the amount of insurance applied for, expressed in \$1,000's.

Experiments.—The experiments that are available to give data on the applicant are the different inspection reports. Their costs are shown.

e_0: No inspection report................ \$ 0

e_1: Use regular life report. 5.00

e_2: Use special life report............... 20.00

A common element of statistical decision models is the random nature of the experimental data. For our underwriter's problem this randomness is due to errors of classification by the inspection reports. The accuracy of the different types of reports can be summarized by conditional probability distributions.

$P_R(T/\theta)$: The probability that the regular life report will indicate rating classi-
fication T when the applicant belongs in rate classification θ. Hence
each column of the table under $P_R(T/\theta)$ is the conditional distribu-
tion for the indicated class, given the applicant's true class:

$$P_R(T/\theta)$$

INDICATED CLASS	TRUE CLASS		
	θ_1	θ_2	θ_3
T_1............	0.6	0.2	0.1
T_2............	.3	.6	.3
T_3............	0.1	0.2	0.6

$P_S(T/\theta)$: Same as $P_R(T/\theta)$ but for the special life report:

$$P_S(T/\theta)$$

INDICATED CLASS	TRUE CLASS		
	θ_1	θ_2	θ_3
T_1............	0.97	0.015	0.01
T_2............	.02	.97	.02
T_3............	0.01	0.015	0.97

$P(\theta)$: The probability distribution of applicants by rating classes:

RATING CLASS

θ	$P(\theta)$
θ_1.................	0.90
θ_2.................	.07
θ_3.................	0.03

This completes the description of the model. It is timely to repeat that
we are illustrating *methodology* and that our numbers are not from prac-
tice.

THE DECISION FLOW DIAGRAM (DECISION TREE)

The decision tree for the decision problem which confronts the under-
writer when he receives an application for M × 1,000 of insurance is
given in Charts A and B. Copies of the large branch in Chart B should be
grafted onto the e_1 branch and the e_2 branch of the basic tree in

CHART A

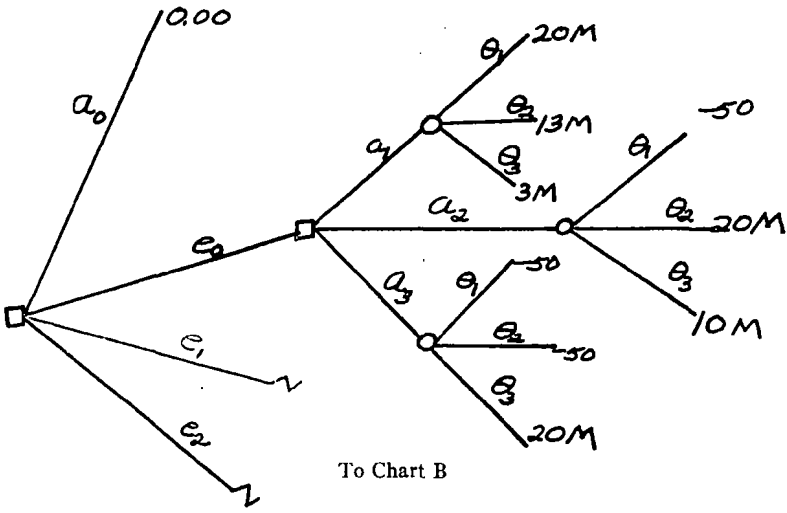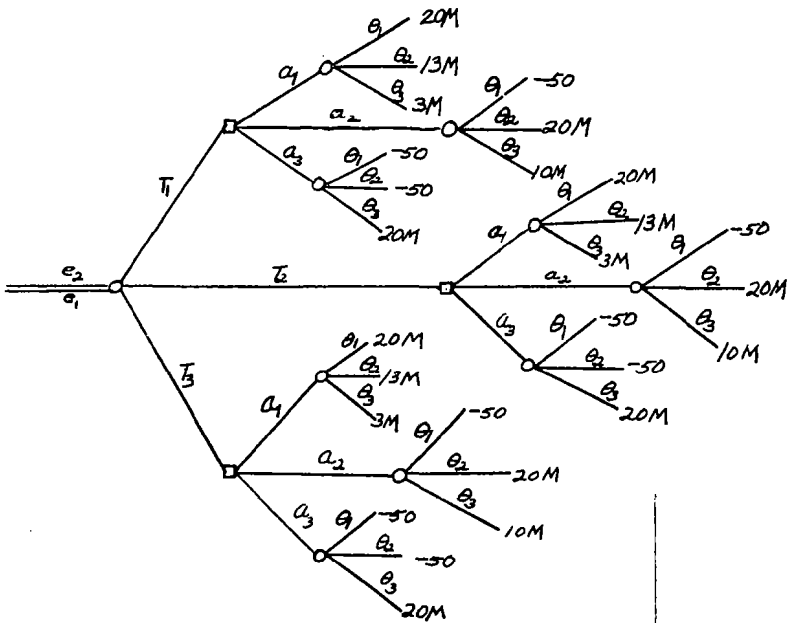## Decision Flow Diagram

To Chart B

CHART B

Chart A. Each path from the tree base to an extremity represents a possible outcome of the submission of the application. At each square juncture the underwriter chooses the next branch to follow. At each round juncture the next branch is chosen by chance or nature. The amounts shown at the extremities are the expected payoffs or expected monetary values (EMV) from Table 1.

THE EXTENSIVE FORM ANALYSIS

The extensive form analysis starts at the extremities and works down the tree.

At each chance juncture (*circle*) the conditional probabilities for the branches emanating from the juncture are used to find the expected value of the payoffs obtainable from this chance juncture. This expected value is assigned as the EMV of this chance juncture, and the branches emanating from it are pruned.

To calculate these EMV's, we need the conditional probabilities that the applicant is in each rating class, given the rating class indicated for him by the requested inspection report. We will use $P_R(\theta/T)$ and $P_S(\theta/T)$ for these probabilities when the requested inspection report is a regular life report or a special life report, respectively. By Bayes's theorem,

$$P_R(\theta/T) = \frac{P_R(T/\theta)P(\theta)}{\sum_\theta P_R(T/\theta)P(\theta)} .$$

For example,

$$P_R(\theta_1/T_2) = \frac{(0.3)(0.9)}{(0.3)(0.9) + (0.6)(0.07) + (0.3)(0.03)} = 0.8411 .$$

These conditional probabilities for the rating class of the applicant given the class indicated by the inspection report are as follows:

| Rating Class	$P_R(\theta/T_1)$	$P_R(\theta/T_2)$	$P_R(\theta/T_3)$	$P_S(\theta/T_1)$	$P_S(\theta/T_2)$	$P_S(\theta/T_3)$
θ_1	0.9695	0.8411	0.7377	0.9984	0.2081	0.2299
θ_2	.0251	.1309	.1148	.0012	.7850	.0268
θ_3	0.0054	0.0280	0.1475	0.0004	0.0069	0.7433

As an example of the EMV calculation at a chance juncture, suppose that the underwriter requests a special life report (i.e., selects branch e_2); the report indicates that the applicant is substandard (i.e., the exper-

iment's outcome is T_2), and the underwriter offers a substandard policy (i.e., takes action a_2). On the decision tree the underwriter has followed branches e_2, T_2, and a_2 to reach a chance (*circle*) juncture. Given this history, his conditional probabilities for the rating class of this applicant are the $P_S(\theta_i/T_2)$'s. Thus his EMV of the expected payoffs obtainable from this juncture is

$$P_S(\theta_1/T_2)(-50) + P_S(\theta_2/T_2)(20 \text{ M}) + P_S(\theta_3/T_2)(10 \text{ M})$$
$$= (0.2081)(-50) + (0.7850)(20 \text{ M}) + (0.0069)(10 \text{ M})$$
$$= 15.77 \text{ M} - 10.40,$$

as may be found in Chart C.

CHART C
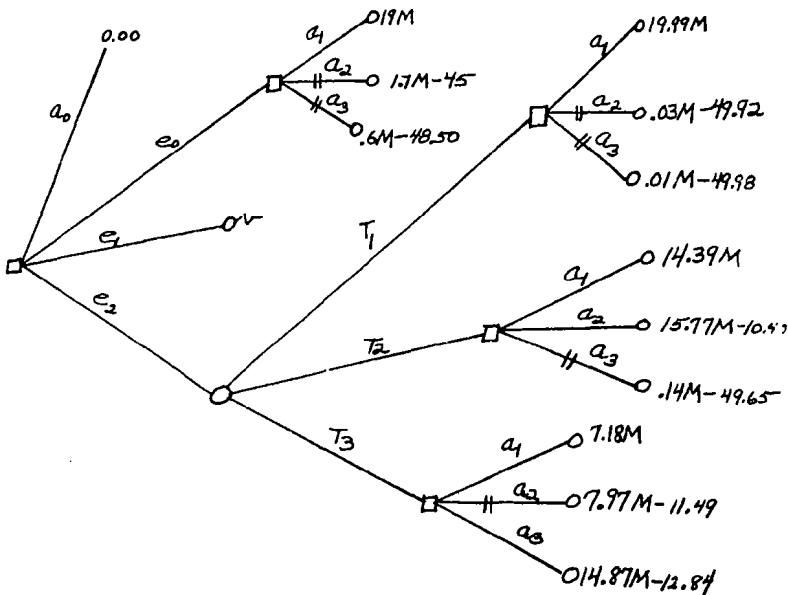
In the extensive form analysis, the EMV assigned to a decision juncture is the largest of the EMV's obtainable on branches emanating (actions available) from the juncture. Since the largest EMV will, in general, depend upon M, the amount of insurance applied for, and since the diagrams are generic trees for all M, the result shown at each decision

juncture in Chart D is that action which leads to the largest EMV as a function of M. If an action never leads to the largest EMV, two dashes have been drawn across its branch in Chart C.

For example, from the decision juncture on the e_2, T_2 branch of the diagram in Chart C, the underwriter may obtain EMV 14.39 M by action a_1; EMV 15.77 M $-$ 10.40 by action a_2; and EMV 0.14 M $-$ 49.65 by action a_3. For M $<$ 7.54, action a_1 has the largest EMV, and, for M $>$ 7.54, action a_2 has the largest EMV. Action a_3 never leads to the largest EMV, so its branch has two dashes.

This process of "averaging out" at chance junctures and of choosing the action leading to the largest EMV ("folding back") at decision junctures is continued until the base of the tree is reached. The cost of the inspection report should be deducted from the EMV of each branch calling for one. These costs are indicated on the e_1 and e_2 branches in Chart E. The results of the extensive form analysis are given at the base of the tree in Chart E. If the amount of insurance is more than $50,950, use a special life report and offer a policy at the indicated rating class; otherwise, use no report and offer a standard policy.

THE CONCEPT OF A STRATEGY

In general, a strategy is a complete set of instructions which specify the action to be taken at each decision juncture which may be reached by following all previous instructions. By referring to the decision tree in Charts A and B, you may construct the fifty-eight strategies available in this underwriting problem.

The first decision juncture is at the base of the tree, where there are four possible actions denoted by branches marked a_0, e_0, e_1, and e_2. On the a_0 branch there are no more decision junctures; hence the specification to take a_0 at the first decision juncture is a complete set of instructions, that is, a strategy, which will be denoted by (a_0).

On the e_0 branch there is one more decision juncture with three possible actions—a_1, a_2, or a_3. Hence this branch gives rise to the three strategies which will be denoted by $(e_0:a_1)$, $(e_0:a_2)$, and $(e_0:a_3)$.

On the e_1 branch there is a chance juncture with three branches leading to decision junctures, each of which has three possible actions. Since each action at one of the decision junctures may be associated with any of the actions at the other two decision junctures, there are twenty-seven strategies, starting with the e_1 action. These strategies will be denoted by

$(e_1:a_i, a_j, a_k)$, where a_i is the action specified for the decision juncture on the T_1 branch, a_j is the action for the T_2 branch, and a_k is for T_3.

The e_2 branch is essentially like the e_1 branch, so there are the corresponding twenty-seven strategies denoted by $(e_2:a_i, a_j, a_k)$ on the e_2 branch. Thus there are fifty-eight strategies in all.

Referring to Charts D and E, you will see that the results of the ex-

CHART D

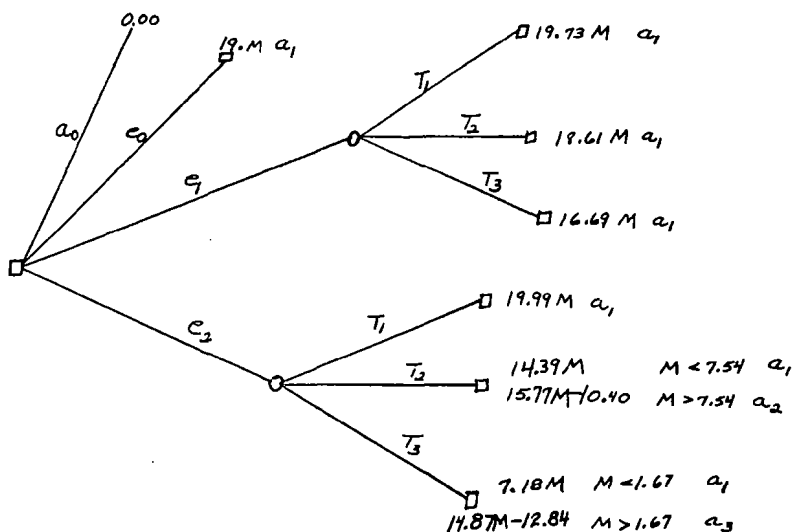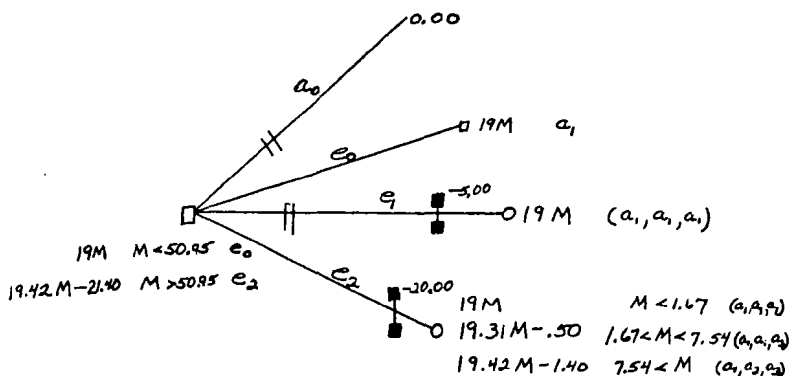## CHART E

tensive form analysis are to use strategy $(e_0:a_1)$ for amounts below $50,950 and to use strategy $(e_2:a_1, a_2, a_3)$ for larger amounts. This extensive form analysis depended on the proportions of applicants by rating class, as shown in the table for $P(\theta)$ on page D442.

<div align="center">THE NORMAL FORM ANALYSIS</div>

For each M, the extensive form analysis led to a determination of the strategy with the largest EMV for the given distribution of applicants by rating class, $P(\theta)$. In normal form analysis the underwriter seeks to find, for each M, the strategy with the greatest EMV for all distribution of applicants by rating classes or, equivalently, the greatest EMV for all three rating classes, if such exists.

Thus the next step in this analysis is to calculate the EMV of each strategy σ for each possible rating class, θ_i. This EMV, which will be denoted by EMV (σ/θ_i), is calculated by a procedure much like the "averaging out and folding back" of extensive form analysis, with the following two changes. At each chance juncture the averaging out is done with respect to a conditional probability distribution, given the rating class of the applicant. At each decision juncture the action is specified by the strategy instead of being that action which maximizes the EMV at that decision juncture.

As an example we will calculate the EMV's of strategy $(e_1:a_2, a_1, a_3)$, given each of the states θ_1, θ_2, and θ_3.

For given θ_1:

EMV $[(e_1:a_2,a_1,a_3)/\theta_1]$

$\quad = (-50) P_R (T_1/\theta_1) + (20\text{ M}) P_R (T_2/\theta_1) + (-50) P_R (T_3/\theta_1) - 5.00$

$\quad = (-50)(0.6) + (20\text{ M})(0.3) + (-50)(0.1) - 5.00 = 6\text{ M} - 40.00$.

For given θ_2:

EMV $[(e_1:a_2,a_1,a_3)/\theta_2]$

$\quad = (20\text{ M}) P_R (T_1/\theta_2) + (13\text{ M}) P_R (T_2/\theta_2) + (-50) P_R (T_3/\theta_2) - 5.00$

$\quad = (20\text{ M})(0.2) + (13\text{ M})(0.6) + (-50)(0.2) - 5.00 = 11.8\text{ M} - 15.00$.

For given θ_3:

EMV $[(e_1:a_2,a_1,a_3)/\theta_3]$

$\quad = (10\text{ M}) P_R (T_1/\theta_3) + (3\text{ M}) P_R (T_2/\theta_3) + (20\text{ M}) P_R (T_3/\theta_3) - 5.00$

$\quad = (10\text{ M})(0.1) + (3\text{ M}) (0.3) + (20\text{ M})(0.6) - 5.00 = 13.9\text{ M} - 15.00$.

An inspection of these EMV's for all fifty-eight strategies would show that for no M is any one strategy best for all three rating classes. In fact, each of twenty-two of the fifty-eight strategies has the highest EMV for at least one rating class and one value of M. These twenty-two undominated or admissible strategies and their EMV's are listed in Table 2. For a fixed M some of the twenty-two strategies are dominated and could be eliminated in the search for the best strategy for that M. However, we

TABLE 2

EXPECTED MONETARY VALUES OF ADMISSIBLE STRATEGIES

Strategy σ	EMV(σ/θ_1)	EMV(σ/θ_2)	EMV(σ/θ_3)
$(e_0:a_1)$	20.0 M	13.000 M	3.00 M
$(e_0:a_2)$	-50.0	20.000 M	10.00 M
$(e_0:a_3)$	-50.0	-50.0	20.00 M
$(e_1:a_1,a_1,a_2)$	18.0 M-10.0	14.400 M$-$ 5.0	7.20 M$-$ 5.0
$(e_1:a_1,a_1,a_3)$	18.0 M-10.0	10.400 M-15.0	13.20 M$-$ 5.0
$(e_1:a_1,a_2,a_1)$	14.0 M-20.0	17.200 M$-$ 5.0	5.10 M$-$ 5.0
$(e_1:a_1,a_2,a_2)$	12.0 M-25.0	18.600 M$-$ 5.0	9.30 M$-$ 5.0
$(e_1:a_1,a_2,a_3)$	12.0 M-25.0	14.600 M-15.0	15.30 M$-$ 5.0
$(e_1:a_1,a_3,a_3)$	12.0 M-25.0	2.600 M-45.0	18.30 M$-$ 5.0
$(e_1:a_2,a_2,a_3)$	-55.0	16.000 M-15.0	16.00 M$-$ 5.0
$(e_1:a_2,a_3,a_3)$	-55.0	4.000 M-45.0	19.00 M$-$ 5.0
$(e_1:a_3,a_2,a_3)$	-55.0	12.000 M-25.0	17.00 M$-$ 5.0
$(e_2:a_1,a_1,a_2)$	19.8 M-20.5	13.105 M-20.0	9.79 M-20.0
$(e_2:a_1,a_1,a_3)$	19.8 M-20.5	12.805 M-20.75	19.49 M-20.0
$(e_2:a_1,a_2,a_1)$	19.6 M-20.5	19.790 M-20.0	3.14 M-20.0
$(e_2:a_1,a_2,a_2)$	19.4 M-21.5	19.895 M-20.0	9.93 M-20.0
$(e_2:a_1,a_2,a_3)$	19.4 M-21.5	19.595 M-20.75	19.63 M-20.0
$(e_2:a_1,a_3,a_3)$	19.4 M-21.5	0.195 M-69.25	19.83 M-20.0
$(e_2:a_2,a_2,a_3)$	-70.0	19.700 M-20.75	19.70 M-20.0
$(e_2:a_2,a_3,a_3)$	-70.0	0.300 M-69.25	19.90 M-20.0
$(e_2:a_3,a_1,a_3)$	-4 M-69.0	12.610 M-21.50	19.66 M-20.0
$(e_2:a_3,a_2,a_3)$	-70.0	19.400 M-21.50	19.80 M-20.0

could not eliminate all but one of the strategies, as may be seen by considering strategies (e_0,a_1), (e_0,a_2) and (e_0,a_3).

The search for a best strategy can go no further without some information about the rating class of the applicant. This information is most likely to be probabilities for the rating classes, and these probabilities may be either proportions or judgmental probabilities. In either case these probabilities may be used to calculate a single EMV for each strategy, that is, EMV $(\sigma) = Pr(\theta_1)$ EMV $(\sigma/\theta_1) + Pr(\theta_2)$ EMV $(\sigma/\theta_2) + Pr(\theta_3)$ EMV (σ/θ_3). The best strategy for each M, *with respect to these probabilities,* may then be determined. As you would anticipate, if $P(\theta_1) = 0.9$,

$P(\theta_2) = 0.07$, and $P(\theta_3) = 0.03$, the best strategies are the same as those found by the extensive form analysis.

Another characterization of the set of admissible strategies in Chart F may be obtained in terms of rating-class probabilities. A strategy σ is included in Table 2 if, and only if, there exist a probability distribution $Pr(\theta_1)$, $Pr(\theta_2)$, and $Pr(\theta_3)$ and an amount M for which EMV $(\sigma) \geq$ EMV (σ') for all strategies σ'.

This characterization leads to the idea of reducing the class of admissible strategies by restricting the set of probability distribution, $Pr(\theta_1)$, $Pr(\theta_2)$, and $Pr(\theta_3)$, to a smaller but reasonably broad set in the judgment

TABLE 3

EMV OF STRATEGIES UNDOMINATED

(When $P(\theta_1) > 0.8$)

$P(\theta_1) = p$	$P(\theta_2) = q$	$P(\theta_3) = 1 - p - q$
σ	EMV of σ	
$(e_0:a_1)$	$(3+17p+10q)$ M	
$(e_1:a_1,a_1,a_3)$	$(13.2+4.8p\cdot2.8q)$ M	$- (5+5p+10q)$
$(e_2:a_1,a_1,a_2)$	$(9.79+10.01p+3.315q)$ M	$- (20+0.5p)$
$(e_2:a_1,a_1,a_3)$	$(19.49+0.31p-6.685q)$ M	$- (20.5p+0.75q)$
$(e_2:a_1,a_2,a_1)$	$(3.14+16.46p+16.65q)$ M	$- (20+0.5p)$
$(e_2:a_1,a_2,a_2)$	$(9.93+9.47p+9.965q)$ M	$- (20+1.5p)$
$(e_2:a_1,a_2,a_3)$	$(19.63-0.23p-0.035q)$ M	$- (20+1.5p+0.75q)$
$(e_2:a_1,a_3,a_3)$	$(19.83-0.43p-19.635q)$ M $-$	$(20+1.5p+49.25q)$

of the underwriter. For example, the underwriter may be willing to restrict the probabilities to lie among those with $Pr(\theta_1) > 0.8$. This is to say that he would agree that at least 80 per cent of the applicants are standard risks. There are only eight strategies, σ, for which there exist a probability distribution with $Pr(\theta_1) > 0.8$ and an amount M such that EMV $(\sigma) \geq$ EMV (σ') for all σ'. Using the notation $Pr(\theta_1) = p$, $Pr(\theta_2) = q$, and $Pr(\theta_3) = 1 - p - q$, we have listed these eight strategies and their EMV's in Table 3.

Further restrictions on the set of probability distributions would limit the number of admissible strategies more. In the extreme we would see that restriction to the single probability distribution $Pr(\theta_1) = 0.9$, $Pr(\theta_2) = 0.07$, and $Pr(\theta_3) = 0.03$ would limit the underwriter to one strategy for each M, that is, $(e_0:a_1)$ for M < 50.950 and $(e_2:a_1, a_2, a_3)$ for M > 50.950, as in the extensive form analysis.

CONCLUSIONS

Decision-analysis models may be used in the determination of rules for purchasing insurance classification information. While we initially agreed to concentrate on a single age, sex, plan, and underwriting category for expository purposes, we can see now that the result would be applicable to all applicants who satisfy the input values used. In other words, if our rules for requesting inspection reports vary with age, then at least one of the elements of the model must vary by age, for example, the distribution of applicants by rating classes.

Decision-analysis models may also be used to determine the amount to spend to collect data about the distribution of applicants by rating classes or the accuracy of the inspection reports.

I close by posing three questions:

1. Does the company consider EMV at this level (*see* chap. iv, Raiffa)?
2. Is this a group decision problem (*see* chap. viii, Raiffa)?
3. How can we extend the tree to include the policing effect that inspection report use has on agents' and brokers' submissions?

MR. JAMES L. LEWIS, JR.: The Management Research Techniques Committee of the Life Office Management Association has been working for the past year on a generalized corporate model. The basic logic has been completed for most of the submodels, and the submodel interfaces are being studied at the present time. We hope to publish our results by next winter.

MR. DOUGLAS O. SANDERS, JR.: Mr. Fraser suggested that the use of regression lines for corporate forecast models was a mathematical excuse to avoid digging into the real world to find out what is actually happening. Mr. Maurer followed with a presentation of such a usage, which could be criticized as being unrealistic in itself but was intended to be hypothetical. Both approaches could and, perhaps, should be combined.

Mr. Fraser's use of several numbers of agents per recruiter in his Table 4 was actually an application of the type of decision testing Mr. Maurer introduced. The managers of New York Life might be asked in what range Maurer's eleven decision values might occur for their company. The Maurer technique could then be tried on the Fraser model for these ranges. Maurer's hypothetical ranges are possibly a shell in which managers would choose decision ranges thought appropriate for their own work habits. A combined Fraser-Maurer approach would be not only a forecasting tool but a kind of corporate planning tool. One caution—all assumptions between the two methods would have to be consistent.

MR. HOWARD YOUNG: I, like Mr. Fraser, have found it very useful to run projections for a number of time periods much greater than that for which the projection is to be used. This will often reveal inconsistencies in the assumptions that might not become apparent if the model were followed for just the useful projection period. In our work in connection with bargaining situations at the UAW, we often will run our projection models out for ten or fifteen years, even though we recognize the unreliability of such long-term economic projections for any single company.

ROLE OF THE ACTUARY IN EXPENSE CONTROL

1. What special interest does the actuary have in expense control? Does he have a special competence in this area?
2. What tools and techniques are available to the actuary for measuring, analyzing, and controlling:
   a) Home office expenses?
   b) Branch office expenses?
   c) Agency-compensation expenses?
3. To what extent are functional costs useful in expense control? Are expense-control incentives being used in field or home office compensation? Are benefit/cost ratios being used to establish priorities or to fix unit responsibilities for management proposals?
4. Are the methods and tools used in expense control different for
   a) Large vs. small companies?
   b) Stock vs. mutual companies?
   c) Single-line vs. multiline companies?
   d) Established vs. new companies?
5. In the light of the loss of expense margins on larger policies and possible future loss of favorable interest margins, can we successfully control future expenses to maintain premium adequacy?

MR. WILFRED A. KRAEGEL: Chairman Gene Bates asked me to talk about this subject from the standpoint of the way the computer relates to the actuary in his relationship to expense control.

My discussion has six parts to it:

1. The actuary's special interest in expense control
2. The computer as a new way to do old work
3. The computer as a new way to do new work
4. The benefit/cost ratio
5. The use of the computer for expense allocation and control
6. The control of computer costs themselves

Let us take that first part—the actuary's special interest in expense control. The actuary looks ahead, if you will permit the poetic license, in his crystal ball to see what future interest, mortality, and expense will be and then designs a policy contract using that information. So the subject of expense control is of broad interest to the actuary. In fact, theoretically the actuary is interested in anything and everything which influences the contract that he designs.

Let us look more specifically, then, at what he does with these three

factors. He makes projections, he designs the contract to meet the projections, and he exercises controls to help fulfill the projections. It is in that last portion of the actuary's job that we find very good justification for the actuary's concern about expense control.

We might view expenses as falling into four major categories: home office, branch office, agents' compensation, and taxes. The actuary has a quite specific concern about the agents' compensation part of it and possibly also the tax part. For the other aspects of expense, the actuary is involved but less directly. The actuary and the controller together may serve as a consulting interface between the president and other areas of the company, so that they have some involvement in expense levels and expense control, without having primary responsibility. The actuary can tell others about probable consequences of their decisions relative to cost, and that is very important. And so, in summary of this part, I believe that the actuary needs as much understanding about costs and cost control as anyone in the company and perhaps more than most.

Let us consider next the place of the computer in the subject of cost control, beginning with the computer as a new way to do old work. We can think of the costs of an activity before and after change to a computer system as being weighed on the two sides of a "seesaw." On the "before" side is what we can call the people approach to a system. This includes a number of traditional ongoing costs—for the people themselves, space, equipment, supplies, and related services.

In order to convert to some new kind of system, we have changeover costs, namely, to design and develop the new system, to convert the data for it, and to switch over to it. On the "after" side, we still have the on-going costs for the people system that I mentioned before, hopefully much reduced. But we have another set in addition—the costs of the computer and its operation, software costs, and systems and programming costs. Relating back to the "seesaw," we want the costs after the change to be distinctly lighter than they were before the change. The question of benefits derived must also be included, and we will discuss that later.

Now let me make some observations about the computer as a new way to do old work:

1. Before computers, overhead was relatively small and costs were roughly proportional to the case load. If you had two hundred loans a day, it took approximately double the effort for one hundred loans. With computers, overhead is increased by the greater variety of ongoing costs, but the marginal cost per case is often greatly reduced. High volume helps to give low unit costs.

2. While the computer reduces unit costs, it also makes possible more kinds of units. Total costs may actually increase as the great potential of the computer

is understood and utilized. This has been found in installation after installation. Of course, it is difficult sometimes to distinguish between higher total costs based on progress and those resulting from inefficiency.

3. The computer replaces known and familiar factors (people doing a recognizable job with understandable tools) with unfamiliar and often unknown factors (people doing obscure types of work with complicated tools and difficult to understand concepts).

4. The computer system is often a "different ball game." Some costs are much higher. For example, the cost to correct an error may be several times as high with a computer system than it was before. On the other hand, some costs are distinctly lower. A classic one that I have run into at the Northwestern Mutual is the effort required to split a general agency into two parts. Twenty years ago it took perhaps thirty people several months to accomplish this. The same job can now be done in about two days by two people, roughly 1/500 the effort. This is an unusual illustration, but it shows the range of changes in cost.

We can also think of the computer as a new way to do new work, including better information, higher levels of service, and the potential for new contracts and services.

Some observations about these follow:

1. Information to the policyowner and to the agent has greatly improved. Information for management is making progress.

2. The computer adds to costs by making it possible to do certain desirable things which were formerly impractical. This may increase costs for certain old contracts, which were not contemplated when that contract was designed and when the premium-loading formula was set up.

3. The computer invites expensive research and developmental work that have potential for high payout but will occasionally result in no payout.

4. The computer also encourages rethinking of the services and contracts which the industry offers, and that has great implication for costs (among other things).

Let us consider next the idea of the benefit/cost ratio. It is really a very simple concept. The cost for a contemplated change may be thought of as an investment, and the benefit should return the cost (or the principal) plus an additional amount which is the return on the investment. One reason that it is difficult to think of this in terms analogous to our usual type of investment is that we should expect much greater returns here. Also the resources for this type of investment are severely limited.

What is a cost? The key is to quantify whatever cost items are being considered. Some of the obvious ones are those we find in the Annual Statement in Exhibits 5 and 6. But those are not the only costs we face. An unhappy customer is a cost. We might miss other opportunities, and that is a cost. There are necessary and unnecessary costs. Unfortunately,

it is very difficult sometimes to determine which is which. There are one-time costs and continuing costs. These all serve to complicate the benefit/cost ratio.

What is a benefit? One frequently used approach is simply to determine the reduced costs which are achieved by the change. But that is not necessarily the only benefit. There might be improved service, more business, reduced turnover (both in the field and in the home office), more and better information, and a stronger base for the future.

As with costs, benefits should be quantified to the maximum degree possible. You have heard of tangible benefits and intangible benefits. It is perfectly appropriate to take so-called intangible benefits and to quantify them. If it is impossible to quantify them, they should receive little or no weight in the final decision process.

Let us get back to the benefit/cost ratio. Several decisions are required to put it together:

1. Which benefits should be included?
2. Which costs should be included?
3. What is the value of the projected benefits and costs in future years, and for how many years should they be discounted and included in the ratio? Three years? Five?
4. What is a minimum favorable ratio? 2 to 1? 4 to 1?

The answers to these questions will be different in various companies, and they will be different from one project to the next. The important point is that there should be a conscious decision about them. And even if the benefit/cost ratio is favorable, it should be compared with the ratios of other projects, as a major factor in setting priorities. Given a favorable ratio with high priority, there is still a final question: Are the resources to do this currently available? If so, the project is on its way.

Let me add a few more observations about the benefit/cost ratio:

1. We have a greater variety of ways to spend money—more equipment, new techniques, greater facilities, a variety of new professional disciplines—on more kinds of activity and diversified business. Our choices have mushroomed.

2. Together with the increased range of choice, we often do not know which route will cost us how much. Interrelationships are more complex and results less predictable, but the tools to accomplish these things are more powerful.

3. The benefit/cost ratio, as a number of you who have worked with it know, is very hard to live with. It is time-consuming. I think "skullbusting" would be a good word for it. It is frustrating and arbitrary. But, really, we do it all the time. We usually do it intuitively and implicitly and often that may be entirely adequate. But sometimes it is not, and we should spend more effort in developing a more valid benefit/cost ratio.

4. The incidence of costs and resulting benefits is an especially knotty one. "Thinking big" can defer benefits too long and cause impatience. But "thinking small" may give too little return and take more time in total.

Next, consider the use of the computer for expense allocation and control. Here are some of the concepts which should be borne in mind. First, the functional cost measures that we have used traditionally are more complicated than they were before. Over the years companies have developed cost factors for premium billing, loan repayment, reserve valuation, and that sort of thing. Those functions have been integrated in many companies, and we are using common files and common program modules to do them. Second, third-generation computers are being used to handle several jobs concurrently. Now this really complicates the question of how to determine the cost of doing a particular function. Perhaps the functions that we have used up to the present are no longer significant from a cost-control standpoint. Expenses can be easily allocated by the computer, but the allocation formulas are more difficult. The computer can do it if we can state what those formulas are. Certainly the actuary has an important role there.

The proportion of the total operating costs tied up in computers makes it highly desirable that operating departments assume at least a part of the responsibility for the share of computer expenses which relate to their work. This can be a part of the budget preparation and feedback system. Much is yet to be done in finding a solution to the cost-allocation problem. Perhaps an EDP subsidiary type of organization could help accomplish this. A few companies are trying it.

The computer is very useful for project control, both in data processing and in other areas. Project control is essentially a technique for getting the most out of resources used by the project and for completing it on time. Obviously, this is highly relevant to cost control. Project control involves these steps: first, estimation of completion dates for various stages of the project consistent with the resources available for it; second, periodic comparison of actual progress with the estimated dates; and, third, corrective action if the project is slipping. Some versions of this technique are very simple, while others are complex and difficult. The actuary will find some understanding of this technique a very useful addition to his bag of tools.

It is difficult to show cost trends which bridge these dramatic changes that have been taking place. One way in which we have tried to do it is through a set of six expense ratios, three of them acquisition unit costs and three of them maintenance unit costs, in each case a cost related to

premiums, to amount, and to number of policies. Even these costs have their limitations, because of other factors which have affected the business of life insurance companies in recent years. But if we do not use something of this sort, then we really have almost nothing with which to compare precomputer and postcomputer costs on a unit basis.

Finally, let us take a look at the question of the control of computer costs themselves. Here again, the benefit/cost concept is very important, and it is used frequently. For equipment acquisition the benefit/cost concept lends itself quite readily. For software project priorities and for systems and programming priorities, the benefit/cost ratio is much more difficult to apply, but we are making progress.

It is very important to tie in the control of computer costs with planning, and this means planning throughout the company. One of the characteristics of computer usage in its early days was the necessity to plan for changes over a longer period in the future than was required in the normal company planning process. Inevitably this complicated the co-ordination of company-wide priorities. Many companies now have a centralized corporate planning and development process, which should be a great help in achieving that co-ordination.

A wise planner will leave "wiggle room" both in computer capacity and in time. No doubt all of you run short of one or the other from time to time, and you will again. The precautions needed to avoid such problems completely are too expensive. But it is very important to try to think ahead to determine how much the project is going to take in time and computer capacity and to leave some margin for maneuverability. This is very important in cost control, since, if deadlines are missed, costs tend to go up.

We can keep in touch with the progress and problems in other companies. Someone else may already have made a molehill out of your mountain.

The next point is probably axiomatic—avoid unnecessary turnover. This is increasingly important in these days when so much of what we do is highly technical. The training costs for personnel are high, and it is all the more important to emphasize personal productivity in the best professional fashion. This requires also that we set up training programs to keep people up to date on developments.

The importance of establishing standards is great, and we have to watch them carefully. Standards were not a major factor in the earlier days, but the computer environment has made them much more important than before.

We should use the best systems techniques. What are they? There are

a number of very good systems books available, but some of the high-lights which were not given a great deal of attention in the early computer applications are such things as the following:

1. Work out the best compromise of human and machine capabilities, so that you are using the best of both worlds.
2. Build in provision for possible future changes. It is still quite common to design a system with the thought that that is the way it will stay. However, we have learned the hard way that computer systems are much more prone to change, because people working with them continually enlarge their horizons.
3. Recognize and anticipate exceptional cases. They can do great damage to the normal flow of operations in a computer system.
4. Expect errors and provide for their recognition and correction. With most systems when something goes wrong, there is inadequate provision built in to meet the failure. You can see this even in our expressway systems. Every-thing goes beautifully while traffic is unimpeded, but, when an accident oc-curs, everything comes to a dead stop because the system is not designed to take care of an error of that sort. The same thing applies in an analogous fashion in systems in a life insurance company.
5. Encourage a good "systems sense" to cut out the unnecessary steps and to simplify operations.

These are some of the things that I have felt actuaries should be aware of as they express their concern in various ways on the subject of expense control.

MR. EUGENE F. PORTER: I would like to discuss several techniques we have found effective for measuring and controlling expenses.

The first is our corporate budget. I would like to detail this procedure by taking you through one budget cycle, not only to present the full pic-ture but, hopefully, to promote discussion.

Our annual budgeting process commences in the fourth quarter of the calendar year. After being apprised of the corporate goals, the depart-ment heads are asked to prepare their operating budgets for the next three years. Appropriate rationale is requested where major changes will be taking place. It can happen, though, that justification is requested and may be just as desirable where no major changes are contemplated in an operation; in particular this minimizes the temptation merely to extrapo-late. After the division heads have reviewed each of their departmental budgets, they forward them to the budget area for assembly. This initial document then consists of two listings. The first is a detail listing of the three-year budget projection of each operating unit. On it are also included actual expenditures for each of the three years prior to the new budget

year and budgets for the prior two years. The second is an enumeration of the departments which are contributing to the budget for a particular account.

After review by the budget people this initial proposal is forwarded to our Cost Control Committee. This group is composed of representatives of top management. It holds a great deal of authority for modifying the budget; however, division heads are consulted before any revisions are made. Incidentally, this is certainly one instance where benefit-cost ratios would be a very handy tool, for, if the total budget must be pared down, it can happen that those programs which have the most articulate support will be kept intact while those which might in fact produce better long-term benefits will be eliminated because of weak presentation. Benefit-cost analysis might well provide a common denominator for better decision making.

In our budget deliberation a device used to measure the financial effect of the three-year budget is something we refer to as our "operating expense index." It is really nothing more than a very detailed calculation of a ratio of actual to expected expenses. Commissions and our fraternal expenditures are excluded from this calculation—commissions because they are directly allocable and fraternal expenditures because they are controlled by a formula. In the calculation of our operating expense index expected expenses are the product of two items: (1) unit costs assumed in the current dividend schedule and (2) projected units. The projected units are taken from our corporate goals for the next three years.

We are now in the process of developing a second-generation operating expense index. We feel that it will provide us with an even better tool for decision making. Briefly, the new model is a composite of three factors—an inflationary index, a service index, and an efficiency index. The inflationary index is a measure of the financial forces at work in the economy. These are beyond our control and can be measured by a published index, such as the consumer price index. The service index is a measure of new services provided our policyholders; it is measured by the cost of these new functions. Finally, the efficiency index is a measure of the cost relative to the base year of maintaining functions existent in the base year. This device will be an excellent planning tool.

During the budget year a number of documents are sent to each of the department managers and their division heads for review. Monthly they receive a detailed itemization of their expenses. Quarterly they receive an analysis of their progress for the year to date; actual and budgeted expenditures and also the variance between actual and budgeted expenditures are listed for each account. An analysis of significant variances

is requested in all quarters except the first. It is not unusual that justification is requested, even though there appears to be no significant variance. This happens where overruns on some items in an account are offset by underexpenditures in other items. In their wrap-up of the budget year the budget people summarize the reasons for major variance.

We have been pleased with the results of the three-year budget. It has forced our managers to plan and has also instilled in them an awareness of daily expenditures.

In conclusion there are a number of things which make a budget work. Some of those which have become obvious to us are the following:

1. Its purpose must be communicated to all the managers.
2. The managers must be apprised of how the budget is constructed and how changes can be made.
3. The managers must actively participate in the budget.
4. The results should be measured.
5. Corrective action should be taken where necessary.

I would like to discuss briefly a planning tool we have utilized in our fraternal program. This may be of interest, since the technique is certainly applicable to other activities and functions.

Because of the nature of our organization we in effect have two sets of corporate goals, for we exist in order to provide our membership with a program of genuine fraternalism as well as a program of insurance. However, the financial resources for our fraternal program are generated by our insurance program; the income is derived from specific charges to our insurance operation.

About ten years ago we found the demands of our fraternal program accelerating at a much faster pace than the corporate indexes supporting it—premium income, investment income, and so forth. So we began to search for a device which would provide year-to-year consistency in the development of funds; it was felt that this would be helpful both in budgeting and in premium and surplus refund calculations. Such a long-range planning tool was necessary not only because of the size of the commitments to this program but also because of the long-term implications of such commitments. A good example of this is our scholarship programs. We are told that we have the largest privately sponsored scholarship program of its kind in the United States. Such a program develops commitments for some years into the future. I should mention that other criteria besides consistency were established for the formula. For instance, we felt that, like any other expenditure, this one should be paid for in an equitable manner by our certificate-holders.

The result was a composite of charges to assets, premium income, insurance in force, certificates in force, and capital gains. All the components except capital gains can be accurately projected for a number of years. Now, of course, the actual expenditures in a year will never exactly equal the amounts generated by the formula. Any positive differences between the formula amount and actual expenditures, however, are accumulated with interest and eventually expended. Since the formula amount is always expended, costing the fraternal program becomes a simple matter in the pricing of our insurance product.

There is one other important matter in measuring the factors which affect the price of insurance that we are just beginning to give some thought to. As important as it is, we recognize that expense is only one of the elements in the cost of insurance to our members. While our operating expense index has been rising in recent years, the cost of insurance has been declining. This, of course, results from the interplay of investment return, termination rates, and expenses. Indeed, it is almost a truism that interest rates will inflate with expense rates in an inflationary economy. We are attempting to develop a simple index which will show the combined effects of these factors.

I would also like to spend a little time discussing agency expenses. We are just now completing a three-year study of our field expenses. In our case there were two prime movers for this study: (1) we were hearing of compensation problems and certain studies confirmed that indeed there were such problems and (2) it was becoming obvious that, in order to maintain an operating expense index at a manageable level, the productivity of our field staff would have to be increased. It was apparent that there was not much that could be done with the numerator of the operating expense index, which, as you recall was actual expenses, because many of these costs are fixed. For example, one of the largest factors is salary, and, since we had no intention of depreciating our human assets, there did not appear to be much that could be done in the way of expense reduction. The only real alternative was to increase the units over which such costs are spread.

I will mention a few of the thoughts that occurred to us and the analyses made in this study.

A matter of great concern is the financial operation of an agency. I think it is fair to say that we really did not know how much it had cost historically or how much it should cost to operate an agency. The bulk of the compensation paid our GA's has been in the form of commissions, although we did pick up some of their expenses. We were aware of their gross commission income and their reimbursed expenses, but we were not

aware of the extent to which they were investing their commission income in their operations. So we asked each of our GA's to give us a detailed breakdown of their out-of-pocket expenditures. We were startled to find that these out-of-pocket expenditures ranged from 10 to 50 per cent of their commission earnings.

There is not much question that we should provide guidance to our sales-management people in this area. This can take a number of forms. One simple approach would be to provide them with a standard accounting system. This should alert them to the extent of their investment. One other technique for creating awareness in the GA's mind is the fractionalization of the compensation package into elements which can be specifically identified as funds for operation of the agency and funds for income net of business expenses. I am also certain that we will be doing more in the way of developing expense standards. One approach that has occurred to us is to relate such a standard to the characteristics of an agency. If one accepts the premise that a major portion of the agency's operating expense should develop because of the GA's contact with his men, then the number of men, the size of the territory, and the location of the territory might be elements in the formulation of such a standard. Incidentally, this kind of analysis might even give some clues as to where the general agent's office should be located in a particular territory.

Turnover in the field staff has both quantitative and qualitative factors inherent in it. Knowledge of what turnover is actually costing might help in deciding whether it is appropriate to pay additional amounts to retain career agents. There can be no doubt that turnover has undesirable effects; the following occurred to us:

1. The time a GA spends on recruiting replacement men is lost for upgrading career men.
2. The productivity of a new man generally is lower than that of a career man.
3. The persistency of business developed by a new man usually is not as good as that of a career man.
4. Higher turnover requires additional investments in the financing plan, in training programs, and the like.
5. Turnover of career men adversely affects the morale of the remaining staff, especially as they become aware of the amounts expended on bringing new men into the business.
6. A satisfied career man may well turn out to be an excellent recruiter, and the opposite also probably holds.
7. Constant churning of salesmen in a territory may have poor public relations implications.
8. The cost of the various servicing units in the home office may well be higher because of the new man's unfamiliarity with all the rules.

While we did not quantify all these elements and as a result were unable to show the combined effect by modeling, we saw enough to warrant a reward for longevity in our new compensation scale.

Probably the most important conclusion reached as a result of our research is that our field operation must become more goal-oriented. This concept was readily embraced by our field management when they were exposed to the facts. And, of course, in order to make such a system work we will be doing a great deal more in the way of monitoring the activities of our field force. Such monitoring will include patterns of earnings, production, man-months of production, and expenses—both direct expenditures from the home office and the out-of-pocket expenditures of the field man. Our agency people have come to realize the value of such monitoring in flagging potential problems. As a matter of fact, they have requested permanent actuarial additions to their staff for this purpose. So in our case the research produced measurable results in more ways than originally hoped for.

MR. H. TODD MORRIS: Today I would like to address my remarks to three aspects of cost control in the life insurance industry. First, the use of a functional-cost-analysis system as a control tool; second, controlling marketing expenses; and, third, I would like to mention briefly some of the special expense problems of new and small insurance companies.

Before discussing the uses of a functional-cost-analysis system, let us first review what is meant by a functional cost. A function is one or a group of operations designed to achieve a designated purpose. The functional cost represents the accumulation of all the elements of expense contributing to that purpose. Chart A shows a typical functional-cost breakdown for ordinary life insurance. The unit costs shown are averages for a group of companies which contributed to the 1968 LOMA functional-cost-analysis study.

An effective functional-cost-analysis system can provide management with a voluminous amount of cost information. Functional costs provide an excellent over-all picture that crosses cost center lines and responsibility areas. Properly analyzed, these data are invaluable as a tool for planning and establishing company objectives and goals. By relating functional costs to appropriate units of measure, the resulting functional unit costs provide an accurate means of projecting the effects on the level of expenses of changes in practices, procedures, and goals.

We have used our own functional unit cost data successfully as a planning tool on a number of occasions. The trend in unit costs serves as a tremendously helpful base for projecting company expenses by line of

business for long-range planning studies. In addition, we have used functional unit cost data to develop comparative costs with regard to converting manual operations to an electronic computer.

Effective cost control depends to a large extent on the ability of the cost-control program to stimulate cost consciousness. This means that

CHART A

ORDINARY LIFE INSURANCE

Description of Function	Unit of Measurement	Unit Cost
Initial functions:		
Selling.................................	Per $1,000 new business	$ 10.86
	Per policy paid for	177.04
	Per $1,000 first-year premium	541.60
Selection........................	Per $1,000 new business	2.25
	Per policy paid for	36.99
Issue............................	Per $1,000 new business	0.77
	Per policy paid for	12.24
Direct maintenance functions:		
Premium collection...............	Per premium collected	0.66
Commission processing............	Per premium collected	0.16
Death claims....................	Per termination by death	30.63
Surrenders......................	Per surrender	8.90
Matured endowments.............	Per matured endowment	27.63
Policy changes..................	Per $1,000 business in force	0.07
	Per policy in force	0.60
Other direct maintenance..........	Per $1,000 business in force	0.22
	Per policy in force	1.74
General maintenance functions:		
Actuarial and other research.......	Per $1,000 business in force	0.07
	Per policy in force	0.58
Electronic planning and conversion.	Per $1,000 business in force	0.07
	Per policy in force	0.57
Other general maintenance........	Per $1,000 business in force	0.02
	Per policy in force	0.13

techniques are necessary for communicating cost data in a form which demonstrates the need for controlling costs to managers and others responsible for a particular area. Functional-cost analysis provides an excellent tool for inducing cost consciousness.

One technique is to demonstrate the degree of expense leverage contained in the premium-rate structure. We might refer to this as a "marginal rate" approach. For various plans of insurance and various policy

sizes, the effect on the premium rate per thousand of changes in the unit costs for the various functions is demonstrated. For example, if premium-collection costs are high, we would show the effect on premium rates if the premium-collection unit cost could be reduced by a certain percentage.

Another method of stimulating cost consciousness is to compare costs with those of other companies with a similar system of operation and similar mix of business. Functional-cost analysis offers the opportunity to participate in the Intercompany Functional Cost Comparison Analysis conducted annually under the auspices of the Life Office Management Association. This study has progressed to the point where there is a good degree of consistency among companies with regard to the definitions of the various functions and functional allocation techniques. The study is extremely useful as a guide for indicating realistic objectives as to expense levels to be strived for. Also, LOMA conducts a three-day review session each summer. The results of the study are discussed, and there is much valuable exchange of ideas about cost-reduction techniques and procedures. In addition to the annual review session, many companies participate in smaller regional groups and with individual companies in analyzing the significance of functional-cost data.

There are other important uses for functional costs; and, in developing such an analysis, the auxiliary benefits should be considered. These other uses include (1) development of cost data for use in gross premium, dividend, and asset share and in other profit-analysis calculations; (2) distribution of expenses and taxes necessary for completion of Exhibits 5 and 6, the Analysis of Operations by Line of Business, and Schedule H of the convention blank.

For most companies expenditures for the marketing operation, including compensation to agents, will account for 70 per cent or more of total company expenses. While this function accounts for the majority of expenses, it also represents the most difficult area as far as controlling expenses is concerned. The life insurance system of compensation to agents often encourages production without proper consideration of the corresponding cost of putting the business on the books.

The most effective approach to measuring and controlling marketing expenses is a subject of much complexity and difference of opinion. What is best for one company may not be best or even appropriate for another.

At Lincoln National we have developed a mechanical tool for analyzing these expenses which has helped us obtain some degree of success in this area. Our marketing function operates under a modified general agency system, with approximately one hundred fifty agency offices. It is modi-

fied in the sense that operating expenses for the agency offices are paid directly through the home office and controlled by the home office. Therefore, at least in this respect, we are similar to a branch office operation. Our primary control tool is an acquisition cost report for each individual office. An example of this report is shown in Chart B. This report is an outgrowth of our monthly budget system, which is used throughout the company. All Exhibit 5 expenses, except new agents' financing costs, are included. Agents' financing costs are controlled by contract and astute administration of the agency force. Our acquisition-cost report compares current-year actual expenditures with the previous years' expenses and

CHART B

AGENCY BRANCH OFFICE

SUBDIVISION   SOMEWHERE, U.S.A.   12-31-69   CODE

Units of Work	Units Per Employee	Year	Expenses to Date			Budget		
			2d Prior Year 1967	1st Prior Year 1968	Current Year 1969	Budget Alloca-tion to Date	Curr. Year Expenses Minus Budget	
							Amount	Per Cent
25,288 26,819 30,856	389 559 551	1967 1968 1969						
764. Telephone and telegram			6,312	6,757	6,474	6,696	− 222	− 3.3
765. Postage			1,271	1,614	1,546	1,596	− 50	− 3.1
766. Printing and supplies			95	54	189	96	93	96.9
790. Salaries and wages			22,695	18,018	23,421	18,852	4,569	24.2
793. Contracted labor			275	576	299	156	143	91.7
794. Savings and stk purch plan			328	256	256	300	− 44	−14.7
800. Co cost empl ben plans			1,892	1,915	1,969	1,584	385	24.3
820. Rents paid			26,682	26,652	24,094	26,664	−2,570	− 9.6
821. Rental of equipment			254	502	405	444	− 39	− 8.8
822. Branch off maint exp			40		82	1,500	−1,418	−94.5
832. Furn auto airplane				310	4,350	3,192	1,158	36.3
840. Maint of off eqpt			166	270	909	648	261	40.3
Subdivision totals...............			60,010	56,924	63,994	61,728	2,266	3.7
Unit costs......................			2.3731	2.1225	2.0740			
Unit cost ratios Subdivision......................			....	0.8944	0.9771	Departmental Expense Report		
Company......................			....	....	....			

with the budget for the present year. The real value of this report is derived from relating the expenses for each individual agency office to the production of the agents attached to that office. The production data are weighted so as to reflect the relative profitability of the various lines of insurance which we market. Also shown is a three-year comparison of the units of production per clerical employee in the agency office. This report provides an excellent indication of the expense situation in each agency office and provides an excellent guide for establishing a realistic budget for each office. Also, it is used as a guide for appraising requests for additional clerical help or office space.

In preparing for this session, I discussed the problem of controlling marketing expenses with one of our marketing executives. He indicated that, because insurance marketing is such a dynamic world, most mechanical tools for appraising marketing expenses are of limited value. They represent a retrospective look at the problem and are helpful to the extent that they indicate things that should not be repeated or things that did work. Apparently what is needed are better techniques and tools for measuring the effects of current decisions on future results.

As a large reinsurance company and also as the parent of a small and relatively young life insurance affiliate, Lincoln National becomes involved in the expense problems with which many new and small insurance companies are uniquely saddled. For these companies, many of which are already operating under a rather precarious financial status, the added impact of the current level of inflation on expenses may well prove to be the final straw that breaks the camel's back.

It is revealing to analyze the operations of companies which are experiencing financial difficulties as a result of abnormally high levels of expenses. Typically, these difficulties can be traced to lack of prior planning and direction which results in misplaced operating emphasis. A partial list of the more common areas where this occurs would include the following:

1. Imbalance between spending for administrative functions and spending for the development of an effective marketing operation.
2. Unwise and excessive expenditures for advertising.
3. Extravagant home office facilities and furnishings.
4. Disproportionate level of executive salaries, which is normally a result of too many chiefs and not enough Indians.
5. Excessive fees for consulting services.
6. Overexpansion with regard to product line and geographic marketing area.
7. Infatuation with high-speed electronic computers and sophisticated software systems.

As previously stated, much of this misplaced emphasis can be directly attributed to a neglect for establishing operating objectives and goals. New and small insurance companies need to determine at an early stage what they do best and then stick to it. All too frequently management seems to ignore the fact that, once premium rates have been set, a budget has been determined. The principal problem is the incidence of expense by year of duration. Ultimate solvency weighs heavily on the abilities of management to co-ordinate, as soon as possible, actual expenditures with the margins implicit in the premium structure.

Regardless of the size of the company and duration of operation, there is no magic formula for controlling expenses. Effective expense control requires the development of an atmosphere of cost consciousness at all levels and constant vigilance of expenditures within the framework of management's objectives and goals.