

THE CHANGING ROLE OF THE ACTUARY

I. *The Actuary and Other Fields*

- A. Actuaries have been more and more involved in work outside what may be considered traditional actuarial functions. At the same time, the nature of actuarial functions has also been changing to adapt to methods and techniques not customarily considered in the realm of actuaries. If these trends continue, what areas of actuarial work will remain common to actuaries but not in the realm of nonactuaries? What is the prospect that actuarial functions as they emerge in the future will be sufficiently cohesive to embrace a unified profession?
- B. Are existing professional boundaries out of date? Is an actuary acting improperly if he performs services in areas traditionally considered within the competence of other professions? In what such areas have actuaries served? Should actuaries encourage members of other professions to provide services within traditional actuarial fields?

*New York Regional Meeting*

MR. CLAUDE J. CASTONGUAY: As formulated, the topic for discussion implies that a valid projection of the role of the actuary of the future, and of the corresponding implications, can be obtained through an analysis of (1) the traditional role of the actuary and (2) the tendencies toward work outside what may be considered traditional actuarial functions. What is suggested, in fact, is basically a retrospective approach.

Since the question is quite important, we cannot take the risk of leaving out factors liable to become significant in the future. In order to achieve this, we must have more breadth than that allowed by the retrospective method, which is too closely related to current practices and their limitations. My remarks will instead follow the prospective approach, leading to conclusions which easily encompass the current trends.

To start with, we must establish how, in broad terms, the role of a profession is defined. To a large extent the role of a profession and its organization are closely related to the functions with which such a profession is charged by society. The degree of acceptance of these functions by the profession itself is also a significant factor in the orientation taken. We can easily bring to mind examples of countries whose economic, social, and political organizations are quite similar but the degree of development of certain professional groups varies significantly.

Therefore, if we accept the notion that the orientation of a profession is greatly influenced in the long run by the society of which it is a part, it

becomes necessary to foresee the general context in which tomorrow's society will be structured. We can then identify certain characteristics of this society that are likely to touch on the role of the actuarial profession.

At the most concrete level we can say without a doubt that the society of tomorrow will be more technological and automated than today's society. If we assume that the level of resources allotted to research and the rate of development of new applications will be at least maintained in the future, we must conclude that the North American continent will, in the not too distant future, be deeply modified physically, economically, politically, and socially.

For the purposes of the present discussion, we may ignore the physical changes and also assume that, let us say, in 1985, the political system under which we will live will not differ significantly from the present. In other words, we will center our attention on the foreseeable consequences of technological progress on our social and economic system.

The rate of technical changes since we have entered the era of the computing sciences allows us to predict without hesitation that the actuary, like many other professionals, will before long have at his disposal a vast information bank. Here we must not only think of the potential of the most sophisticated computers taken as individual units. We must rather think of networks of computers linked together through modern telecommunication systems.

This new element of technology will have a profound effect both on the practice of many professions, including ours, and on the kind of knowledge which will be transmitted to those who will want to practice such professions. It must be remembered that traditionally, universities and certain professional or scientific groups have acted as information banks and the main instruments for the transmission of this information. As far as the professional was concerned, he was also to a great extent an information bank of reduced dimension, and it was mainly through the information stored away by each individual that professions were practiced.

We also know that computers are more than vast information banks, that they are above all the instruments for the processing of information that can analyze and come up with answers to the most complex questions. Actually, many, if not the majority of us, are in a position to perceive how considerable and profound will be the consequences of the progress of the computing sciences on our ways of practicing our profession.

What exactly will these changes be? First, at the level of professional training, it will be necessary to prepare actuaries who will differ significantly from the actuary who has a good memory, who has a certain analytical training, and who is mainly orientated toward life, accident, sick-

ness, disability, and retirement insurance as transacted in the private sector of the economy. The emphasis in the training will be put on the scientific aspects rather than on the professional.

In other words, training will be directed to a greater extent toward the ability to synthesize and to identify significant interrelationships and the development of scientific models. This training will also need to be rounded by giving the student the ability to formulate the proper questions for the computers and to develop the necessary models that will allow them to answer the truly significant questions.

To summarize, let us say that the actuary, if he wants to maintain his relative position with the surviving professions, will have to orientate himself much more toward research and scientific creativity and much less toward routine applications of principles acquired through experience.

Out of curiosity, I compared the present requirements for admission in the Society with those of approximately fifteen to twenty years ago. To be frank, I found only two changes worthy of mention—slightly less accent on memorization and a first step toward specialization. With respect to the training approach and methods, nothing appears to have changed. When compared to the new orientation that is indicated, this seems to be very little and, to a certain extent, quite disturbing. If we think of the extent to which training methods and approaches have been modified in a great number of colleges and universities, we must conclude that we need to reappraise our philosophy with respect to the training of future actuaries.

We cannot avoid asking ourselves if the time has not arrived to give the university a much larger responsibility if we want to train the actuary required for tomorrow. The profile of this actuary, judging by the diverse fields that already call upon the talents of today's actuary, requires greater flexibility in the whole approach to his training. First, it will be necessary to prepare actuaries of the scientist type in greater numbers; in other words, a kind of actuary almost unknown to us. Second, this actuary and the professional actuary should be given much more opportunity for specialization within the actuarial field than is now the case. Finally, at another level, there should also be more flexibility, so that combinations with other kinds of scientific or professional trainings could be made at the level of the Master's or Doctor's degree.

Following this first series of conclusions, I would like to return to the characteristics of tomorrow's society, which, as we have seen, will be highly technological and will assign a more active and significant role to professionals and scientists. In other words, these two groups will, tomorrow, have relatively more power than they have today.

Therefore, in order to become gradually more and more responsible for

the common welfare of society, professionals and scientists will have to direct more and more effort toward finding and developing new ways of making available to the greatest number their knowledge and ability. This becomes especially true for the actuarial profession if we remember that the role of a profession is to a great extent defined by society in relation with its needs. Since some of the implications of this conclusion could be quite significant, I will try to bring them out.

To start with, let us draw a brief parallel between the past evolution of society in our Western countries and that of our profession. We can establish that the actuarial profession was born at the beginning of the industrial era. We may assume without any great risk of error that our profession came into being in response to the new economic and social risks that accompanied industrialization and its related characteristics—urbanization, the wage system, the modification of the family unit, and so forth.

In fact, the actuary has been the architect of most arrangements that were developed to protect against the risks that gradually became identified as we progressed through the industrial era, namely, the various forms of insurance, on a private or public basis, against the risks of death, accident, sickness, retirement, and, more recently, unemployment.

One could then justly say that the actuary has made his knowledge of the risk and probability theories available to serve the industrial society in response to the problems arising out of the risks that were an integral part of it. It must be noted, however, that his effort was much more limited, at least as far as North America is concerned, in the field of social insurance and even more limited with respect to fields outside that of insurance.

Based on this parallel, we can assume that new social risks will come into existence in the future and also that the consequences of traditional risks are liable to change significantly.

As an example of a new social risk, let us take that of unemployment. At the time when unemployment was identified as being an insurable risk, when methods for its measurement were developed together with various programs of unemployment insurance, only cyclical unemployment was then known to exist. Since then four new forms of unemployment have either come into existence or been identified—seasonal, frictional, technological, and structural.

What kind of arrangements should be made with respect to these new social risks? Should some form of insurance coverage or of funding for the future costs of retraining services and allowances be developed? This question and others of the same nature are very complex, and multidis-

ciplinary teams are working on their various aspects. Should not the actuary be at least part of these teams or even act as a leader?

As far as the traditional risks are concerned, their economic impact will definitely be different as we go forward in the era of the affluent society. It is now obvious that our productivity is more than sufficient to meet the material needs of the North American population, and the problems created by the disposal of our surpluses in many areas constantly remind us of this fact. And we know very well that in order to contain social tensions and to increase the volume of consumption so as to maintain in the long run the dynamism of the economy, our society will in the foreseeable future solve the problem of a more equitable distribution of material goods and services. The elimination of the more pronounced differences within the population with regard to access to material goods and services will thus be another new element of the society of tomorrow. Obviously, social risks will not entail under these conditions the same consequences on the individual, the family, or the collectivity as those at the present.

If the actuary is to participate as fully in this evolutionary process as he did during the industrial era, he will have to be prepared to contribute to the identification and measurement of the new risks and, also, to anticipate the modified consequences of the more traditional risks. He will also be no longer able largely to isolate himself with respect to these functions, because, as has already become evident, they will be handled by multidisciplinary teams working in a context where professional barriers will tend to disappear.

It is precisely for this reason that the choices that have to be made are pressing. The actuary cannot continue much longer to isolate himself to a large extent in professional societies, such as this one, and to concentrate mainly on what is being called broadly the "life insurance field." Otherwise, the new functions that I have tried to identify, and many others that we witness today, which should call upon the specialized knowledge of the actuary, will be assumed by others.

We come back again to the need to train scientists with a specialized knowledge in actuarial science who will devote themselves mainly to research and teaching. And, in addition to these scientists, a need is indicated for professional actuaries who have specialized in various fields and who will be ready to go wherever their services are required in the economy. This latter need is becoming more and more evident. I therefore come back to the conclusion that universities will have to take a much greater part in the training of tomorrow's actuaries.

Finally, since the attitude of a profession is also a significant factor in its orientation, it is necessary to take a look at today's actuaries in general.

And my analysis brings me automatically to the conclusion that the actuarial profession as a group will have to give relatively less importance in the future to the development and attainment of "corporate goals" and much more attention to the areas where the actuary's knowledge will help solve the problems of the citizens living in tomorrow's society.

It is therefore, in my opinion, the extent to which the actuarial profession is able to bring the proper answers to these various challenges that will determine the extent to which the profession will remain dynamic and, consequently, cohesive. The alternative is gradual atrophy and possible disintegration; I do not believe that there is room for the status quo.

**MR. WILLIAM H. BURLING:** I have long believed that the actuarial "profession" is an illusion. There is no real body of knowledge of which we have exclusive possession, as is the case with doctors and lawyers. The technical aspects of our knowledge are being used by persons engaged in other fields, such as operations research and statistical estimation. I think that, if we look at the members of our profession who have achieved positions of responsibility, we would have to admit that most of those positions could be filled adequately by persons not members of our Society.

The current of change in the science of management of corporations is running very fast, and it may be that, without knowing it, we are already just a little eddy on the side of the stream. I would like to recommend that, while we continue to have committees to discuss the immediate future on education and examinations, we also establish a special committee to think of the Big Leap Forward. This committee should preferably consist very largely of members who have been Fellows for ten years or less, and it should make active contact with people in other fields that might involve techniques similar to ours. Our long-range thinking should contemplate eventual coalescence of our Society with these other societies. Meetings of this professional society would be similar to meetings of the American Medical Association, where there would be many divisions catering to different types of specialists. To the extent that we are engaged in purely "business" matters connected with insurance company work, we could more properly operate as sections of an organization such as the Life Insurance Association of America.

**MR. PEARCE SHEPHERD:** As one who had responsibilities in the running of the Society for a number of years, I would like to put in a word for the defense.

The Society has made many changes over the years, not only in the examination requirements and subject matter but also in the conduct of its meetings.

The programs for the spring meeting indicate very clearly that the Society has responded to the changing character of actuarial work and the actuary's role. I believe that over two-hundred members were involved in planning these meetings and in carrying them out.

Perhaps other changes are in order, but I want the record to show that the management of the Society has been responsive to its membership, which has grown in numbers and complexity. The Society is not moribund.

**CHAIRMAN E. SYDNEY JACKSON:** With the increasing sophistication and complexity of business, I foresee professional boundaries and barriers breaking down. In a simpler society a hundred years ago, there was no doubt good reason for requiring lawyers to practice law only in partnership with other lawyers. But, today, does it make sense to refuse to allow a lawyer to practice law if, say, he has a consulting business in partnership with a chartered accountant? Actuaries, of course, have only become recognized legally within the last few years, subsequent to the formation of the American Academy of Actuaries and the Canadian Institute of Actuaries, and so—fortunately, in my view—have not raised many professional barriers. I do not know whether we should encourage members of other professions to provide services within traditional actuarial fields. I know we cannot very well object if there are not enough qualified actuaries. We should not raise barriers against other professions who have acquired an expertise in what we may regard as our preserve, and we should encourage other professions to lower their barriers in those areas of their profession that have common ground with other professions. More and more in the future we are going to need multidisciplinary teams to solve our problems.

**MRS. ANNA M. RAPPAPORT:** It seems to me that our profession has missed opportunities for which we are ideally suited. I am reminded of the following quotation by Mr. Theodore Levitt in the 1960 *Harvard Business Review*:

The railroads did not stop growing because the need for passenger and freight transportation declined. That grew. The railroads are in trouble today not because the need was filled by others (cars, trucks, airplanes, even telephones), but because it was not filled by the railroads themselves. They let others take custom-

ers away from them because they assumed themselves to be in the railroad business rather than in the transportation business.<sup>1</sup>

Actuaries have training and experience in using specialized mathematical and statistical techniques to solve real world business problems. For the last few years, all businesses have become more and more dependent on the use of mathematical techniques for the solution of their real world business problems. Our profession has experience with solving problems in the insurance and employee benefit plan areas. Why have we not used that experience to approach other types of business problems? We have left business school graduates, operations researchers, and others to deal with many types of problems that we have been better equipped to handle.

MR. EDWIN B. LANCASTER: The basic philosophy of the Society's education and examination system is that the educational material should be designed so that it can be "self-teaching." While we are well aware of the valuable educational contribution made by such "actuarial" universities as Iowa, Laval, Manitoba, Michigan, and Nebraska, we are also acutely aware of the fact that a majority of our students come from universities other than those with actuarial courses. Since the students literally come from the length and breadth of the North American continent, it seems absolutely necessary that the educational material be self-teaching. The requirement for self-teaching educational material imposes a fairly heavy burden on the committee in preparing and seeking out material. It also means that we cannot move into new areas until adequate self-teaching educational material is available. Despite these educational restraints, I feel that the Society has indeed made good educational progress.

MR. WALLACE R. JOYCE: Whether he works in an insurance company, consulting firm, government, or elsewhere, today's actuary is receiving increasing contact with other fields, such as operations research, investment, law, medicine, and accounting. Much of this has been brought about by the impact of legislation and government, particularly social security developments. Perhaps the particular genius of the actuary is to bring his training and background to bear on all these related problems through an empirical and practical approach.

<sup>1</sup> Theodore Levitt, "Marketing Myopia," *Harvard Business Review* (July-August, 1960).



MR. HOWARD YOUNG: The portion of the topic that was specifically assigned to me has four explicit questions. For three of them I feel the answers must be generalities which can only be tested in specific situations; thus my discussion will concentrate on the remaining question, "Are existing professional boundaries out of date?"

First of all, except in those few professions where an area of activity is legally designated as being exclusively within the province of that profession, I am not sure many of us could agree on the exact boundary between any two professions. Furthermore, I expect that any boundaries which could be agreed upon would quickly be outdated by developments not contemplated by the agreed-upon definition. I believe, therefore, that any set of existing professional boundaries will almost always be out of date.

"Is an actuary acting improperly if he performs services in areas traditionally considered within the competence of other professions?" The actuary is not acting improperly as long as he does not violate any legal restrictions (e.g., on the practice of law or medicine) and he has adequate knowledge to perform the activity he undertakes. In other words, I feel the major point is that the actuary (and any other professional) should have the self-discipline to keep himself out of areas in which he does not have adequate knowledge to act as an adviser.

"In what such areas have actuaries served?" This is the question I will discuss further.

"Should actuaries encourage members of other professions to provide services within traditional actuarial fields?" Here, again, I believe that the major question is one of adequate knowledge. We have the right, and an obligation, to object to the activity of anyone in an area he is not capable of handling. On the other hand, it is valuable to have different points of view on a problem; we should encourage participation by non-actuaries in areas in which they (or we) may not be prepared to act alone.

The references to "adequate knowledge" are intended to indicate more than technical skills. Too often, an individual who has mastered a technique (e.g., actuarial mathematics) does not sufficiently recognize that a professional must also be able to evaluate whether or not that technique is being properly applied to the problem at hand. Thus an actuary must be prepared to do more than an actuarial calculation; he must be prepared to determine whether the assumptions used in that calculation are appropriate.

With respect to the factual question concerning "nonactuarial" areas in which actuaries have served, we are almost by definition talking about a relatively small group of actuaries. Practically any activity within an

insurance company or similar organization would be considered within the confines of "traditional actuarial fields"; thus few actuaries employed by insurance organizations have an opportunity to get into "nonactuarial" areas. Consulting actuaries have more opportunity for such activity, and Claude Castonguay has given us an indication of what the future may hold in that respect.

I will cite some experiences of the small number of actuaries who—having been employed for their actuarial skills but by nonactuarial employers—become involved with the clearly nonactuarial activities of their employers.

In my own case, I was employed by the auto workers' union (UAW) as an actuarial consultant on employee benefits. My activities soon extended to such semi-actuarial areas as collective bargaining for employee benefit programs, educational activities with respect to such programs, evaluation of various legislative proposals, and the formulation of general and specific employee benefit plan goals to be sought by the union. Going further afield, I became involved in the following areas: financial evaluation of any collective bargaining changes, nonfinancial programs for retirees, and analysis of all programs where contingent occurrences could have a significant effect upon the actual working of the program. Currently, I am director of a computer operation intended to become a general information center for the organization.

One large firm has a staff actuary, who was hired to consult on employee benefit plan questions, with interests in the following types of questions: What attendance pattern can be expected from a growing work force? What is the anticipated cost of various product guarantees? Where a product is sold in relatively small quantities and reordered by the customer, is there any profit potential in trying to upgrade the customer's desires by giving him a free sample of a more personalized version of the product?

In my opinion, these examples reflect the fact that an actuary's training provides him with skills that are applicable to many areas outside "traditional actuarial activities."

Actuarial mathematics (the combined interaction of discounting for investment and contingency effects) is probably the core of a uniquely actuarial activity. But the type of analysis developed in that mathematical technique is useful in most situations involving group activity subject to contingent occurrences.

More importantly, an actuary's training requires him to consider such questions as the following:

1. Is the proposed solution to any particular problem salable? Too often people come up with a solution that is technically feasible but basically unacceptable to the people actually affected.
2. Is the proposed scheme practical; that is, can it be implemented?
3. How can large amounts of data be handled, and how can significant conclusions be extracted? It is this capacity that equips actuaries for a supervisory role with respect to electronic data processing installations.

Finally, since the basic function of the actuary has always been to find group solutions to financial uncertainty, I feel it quite appropriate for actuaries to be involved in the increasing number of situations in which group activity enables individuals better to meet the financial problems which face them.

MR. ROBERT A. NIX: My employer is the Ontario government, which governs a province having a population of about  $7\frac{1}{2}$  million. The Ontario Civil Service is divided into branches within divisions within departments. I joined the service in September, 1968, as director of the actuarial services branch.

The actuarial services branch is a part of the advisory services division, which functions as an "in-house" management consulting service for the government. Other branches in this division are organization and methods, automatic data processing, and management science (operations research). In turn, the division is a part of the Treasury Board Secretariat, which has department status and which provides support for the Treasury Board, a cabinet committee chaired by the Treasurer of Ontario. The Board is charged with the financial and administrative management of government operations.

Up to now, I have had fairly extensive exposure to various departmental actuarial problems. My "clients" have included the Superintendent of Insurance; Public Service Superannuation Board; Pension Commission; Department of Lands and Forests; Department of Revenue; Staff Relations Branch; Crop Insurance Commission; and the Energy Board.

The last-named is perhaps the only one which has unusual actuarial problems. This Board considers submissions from public utilities for rate changes. The profitability of utilities is strongly influenced by depreciation charges on equipment. In turn, the depreciation charges are influenced by statistical studies of installations and replacements of equipment, and these studies can be represented graphically by survivor curves. A survivor curve shows the number of units of equipment in service at various service ages and is analogous to an  $l_x$  curve. In fact, Gompertz

and Makeham formulas have been used at times in preparing these curves, although in practice there is a considerable variety of curve shapes.

Crop insurance, as far as I can gather from my slight exposure to it, seems to be largely a statistical problem involving an assumption of normally distributed yields per acre and a constant or assumed mean yield and standard deviation in yield. The approach is to insure a crop for, say, 80 per cent of assumed mean yield, at a certain price per unit. With the mean yield and the S.D., the total acreage, which will have a yield less than the insured yield, can be calculated with reference to a table of areas and ordinates of the normal curve.

MR. LOUIS WEINSTEIN: Oil companies, supermarkets, department stores, and now automobile companies have been experimenting with consumer games resulting in controversy among merchandising experts. Costs have been high, credibility has been low, and the initial competitive edge has fast disappeared as competitors introduce their own games.

A new development is the probability game, which gives each player an equal chance and which precludes any possibility of rigging. All these games involve a chance situation where the player must uncover concealed items on a card in the hope that he will guess the "right" ones and avoid the "wrong" ones. The honesty of the game is readily demonstrated when the loser sees that he had a chance of winning.

As actuarial consultants, we have been asked to do several things:

1. Calculate the probability of winning and the expected payout for a game which has been designed.
2. Calculate the probability that the aggregate payout will fall within a given range.
3. Calculate the parameters in a game which has been partially designed in order to yield the required probability of winning.
4. Certify to the mathematical accuracy of our client's report on expected payout.
5. "Play" the game on a computer in order to further assure the retailers of the reliability of the figures.
6. Calculate the number of different plates required to print the game cards and the deployment of winning circles on each plate to avoid "antiselection."

Our firm assists honest merchandising consultants in providing their services to retailers while assuring the retailers that the consultants' service is based on correct arithmetic and sound mathematical theory. On the other hand, many people believe that consumer games are not in the public interest. In addition, there are ways in which a game could be changed after our certification, which would be embarrassing.

*Atlanta Regional Meeting*

MR. SYLVESTER J. HUSE: It is indeed an honor as an unfrocked actuary practicing as an accountant to participate in this session this morning. Actually, the role that I have played as an actuary has not followed, or even approached, the descriptions of it that one reads in our public relations documents now distributed to students all over the land.

I was employed by the American Telephone and Telegraph Company in 1950 to work on actuarial matters. I managed to pass six examinations—none on the first try—under one of the old syllabuses, and, when the Committee on Education and Examinations decreed that I would have to pass certain piece parts of newly numbered examinations—designated by letters—it seemed to me that I was losing ground and I made the decision to give up the effort.

As a consequence, I started working for the telephone company on a full-time basis and was appointed to my present position about two years ago. As a matter of record, I cannot say whether the fact that I flunked Part VII twice, which at that time included life insurance accounting, was given any consideration in the decision. The recent discussions between the actuaries and the accountants on adjusted earnings have developed a doubt in my own mind that the Examinations Committee was right and that I was wrong.

As a matter of information, my company, Pacific Northwest Bell, operates in Washington and Oregon and has revenues of some \$400 million per year. In the process of collecting those revenues, we rate some 160 million toll messages per year and send out some 16 million bills per year. The comptrollers department is responsible for doing these chores, as well as all data processing in the company.

Some of the training and experience that I had as an actuary are indeed of great value to me in my job today. I would like to discuss a few specific items.

Probably of greatest value is the *long-term view* that we actuaries necessarily have to take of things. This has helped me to plan for the things coming over the horizon. For example, we now have a planner for our machine configuration as well as a planner for the entire department.

A *knowledge of probabilities* and an awareness of them are of great value. My staff assigns probabilities to certain events' happening, and we apportion the time spent on discussing these events accordingly.

The *financial know-how* that I acquired as an actuary has been most helpful. In an industry as "capital intensive," as the analysts say, as the communications industry, our financing needs are constantly before us.

And, as a last example, the *need to quantify* was impressed on me during my actuarial years. I studied and guessed and then put down a figure and signed my name. There is a great need for this approach in my current job.

Now I would like to leave some of my concerns with you.

I am disturbed that the examinations are so important to those who employ actuaries in the United States. It is my understanding that actuaries elsewhere are more inclined to extend their "fields of activity." My own impression is that our students study primarily to "pass" and not to "learn." Does this result in our members' viewing the examinations as an end and not a beginning?

Perhaps it is a sign of weakness in the management of the employers of actuaries that they rely so heavily on this performance. In my own company I have the same doubts about the obeisance we pay to formal educational achievements. Speaking for myself, I have found little correlation, if any, between these achievements and effectiveness on the job. In my opinion, weak managers tend to lean on management tools to justify their actions. Perhaps examination performance could be classified as one of these tools.

I would, therefore, like to leave with you the question, "Is the emphasis that we place on the examinations the reason for the actuary's reluctance to leave the traditional fields of endeavor and to expand his fields of activity"? Perhaps, I would submit, this emphasis might well attract the wrong kind of people into the Society.

And now I address myself to the Society as a whole. The Society provides no incentive to leave the fold. The fact is, however, that the disciplines developed during our course of studies provide a good foundation for other activities. As an analogy, a good many of us studied Latin even though we never intended to speak it.

In my opinion, the Society provides negative incentives to enter fields of new activities. I would ask whether or not it is abdicating its responsibilities by not encouraging its members to move into any fields in which they can contribute—fields such as operations research, mathematical modeling, and other management sciences.

Maybe it is time for the Society to review whether or not it is wise in not encouraging its members to leave the traditional fold. There is an old saying about children that goes to the effect that the only way to keep them is to let them go.

MR. CHANDLER L. McKELVEY: We have a planning department at Sentry comprised of three men—an accountant, a systems man and an

economist. They are engaged in long-range planning operations research. Their world is made up of Markov chains, decision cycles, predictor variables, stochastic processes, cross-sectional data.

I have noticed two things about this group; first, they seem to operate easily in that environment of awe mixed with envy that actuaries have long considered their own, and, second, they consider it as beyond question that the actuarial craft—our bag of arithmetical tricks—is not only very elementary and old-fashioned but largely irrelevant.

We also have a large data-processing department. Many of the young men there—particularly those engaged in the development of our integrated, multicorporate Management Information System—would be actuarial trainees if they had come into our business ten years ago. Do they have an opinion of our profession? They do indeed. Like Hollerith Cards, we represent a necessary link to the past.

I attended a meeting a few weeks ago to see a preliminary demonstration of a new working sales-force model. The objective of this model was to give field management down to sales-team level good, current information on likely manpower needs in order to accomplish short-range production objectives and a variety of other related information. The model turned out to be very practical and flexible, reacting to a number of variables in a meaningful way. Everyone was pleased and impressed.

I was impressed too—not only at the new model but at a use and attitude toward actuarial science expressed in the presentation. It was explained how the old-fashioned method, which for lack of a better term they would call the “actuarial approach,” would produce a single answer to the question of, say, how many men were likely to remain twelve months from now out of a team of ten and what their likely production would be. A clever or conscientious actuary might produce a high, medium, and low projection but would have then reached the limit of his capacity. All this was contrasted with the new methods—based on random processes—which added several dimensions to the results and allowed much greater depth of analysis.

I, of course, objected to the way the term “actuary” was abused, but—like the bumper stickers for Barry Goldwater—in my heart I knew they were right.

I attended another meeting a few days later to discuss the implications of our new tool and the further steps that we might want to take along the line now started. This was a management meeting, a policy group. Our life actuary was there, as was his fire and casualty counterpart. The technicians—the management information specialists—were not. Why not? I am sure that is debatable, but I think that it is most likely because

they are, in fact, technicians, specialists, and not insurance professionals. The actuary is the insurance pro, and his standing comes only partly from the technical training.

I cannot honestly feel that any of the possessors of these new mathematical skills really threatens the actuary or that we should feel that we must ape them—learn everything they know. I think that we should encourage them with all our heart, for, God knows, our industry needs all the scientific management it can get.

But the sum of the skills of a long-range planning specialist, or an operations researcher, or an information designer does not add up to professional knowledge. The long-prevailing influence of the life insurance actuary does not rely on a mathematical bag of tricks; otherwise, we would have disappeared long ago. We have prevailed because of the feel for the industry that comes through the examination process, the overwhelming completeness of our knowledge, our professionalism.

Does this mean that we should ignore the new fields? We must at least understand their capabilities and limitations if we are to use them effectively. I suppose that some of our brighter young men will even become experts. But let us not panic. Let us not put queueing theory on the syllabus. Let us stay the professionals in this business.

It is interesting to note that all professions and academic disciplines are faced with problems identical to ours in coping with the knowledge explosion. Some have responded by narrowing their boundaries, making their fields more specific and esoteric; others have responded by growing. These are our two choices—standing still is not.

MR. GEORGE J. ROCCAS: I agree with Mr. McKelvey. I believe that actuaries should be generalists and not try to become experts in allied fields, such as operations research. From the discussion it appears that there is some misconception about what operations research is. It is more than merely computer programming. It includes a number of fields, but those that I am most familiar with are mathematical programming and game theory. To become expert in just these fields would take several years of intensive study. There are graduate students at large universities who pursue doctoral degrees in the game theory area alone. For actuaries to become proficient in these areas it would require a great deal of effort and time. It would be better for actuaries to recognize these special areas and call upon the experts of these areas when necessary.



## II. *Setting Corporate Goals*

- A. What is the role of the actuary in development of corporate goals? Can the actuary assist in determining whether or not these goals are realistic and consistent?
- B. How can goals be stated on a basis to which individual operating units can relate? How can the performance of units, such as a service department, the actuarial department, and the controller's department, be measured against goals?

### *New York Regional Meeting*

MR. C. NORMAN PEACOR: The first question to which I will address myself has to do with actuaries' involvement in the development of corporate goals. Answering by saying that it is obvious that the actuary must be involved is like quelling any debate on whether the sun will rise in the east tomorrow. No matter how few or how many are the goals, there will always be mixed in, either explicitly or implicitly, those which relate in some way to the company's financial abilities or capabilities. This is in the actuarial realm.

Let me give an example of an explicit relationship. It could be argued that there is some proper proportion of surplus to assets by line of business. Safeguards against unusual mortality or morbidity fluctuations are capable of mathematical analysis and expression. For example, very little surplus need be held under today's group pension contracts, which are written primarily as investment vehicles. By contrast, the high degree of risk in underwriting disability business may call for substantial amounts to be built up. Differences between ordinary and group lines of insurance will call for different levels of surplus. All told, these can be measured, summed up, and expressed.

Insofar as surplus requirements are needed for the contingency of investment loss, this, too, is at least capable of some subjective as well as objective valuation. Some of this is expressed through the form of the Mandatory Securities Valuation Reserve. Many companies, including our own, set aside in surplus other amounts to cover the contingencies in the mortgage loan and real estate fields.

It goes without saying that the actuary is vitally concerned with arriving at the proper amounts of surplus to be held for what would be termed actuarial purposes. On the other hand, there are management purposes for these sums of money which were carefully explored in Mr. Charles Trowbridge's paper in Vol. XIX of *TSA* (1967). These factors may override the purely actuarial consideration, but the actuary is vitally concerned and involved in the final determination.

We can also derive an implicit actuarial assist for the sales goals. While the expression of these goals might be properly the area of the agency head, there are, nevertheless, some real financial implications. Substantial increases in new business will put an obvious financial strain on the company. This strain will be all the more pronounced in those companies using the net level premium method of reserve valuation and could even paint an apparent picture of red ink operations. That this matter is of great concern is evidenced by the attention paid by actuaries and accountants to value the worth of a life insurance company.

Whether the agency sales goals are realistic and consistent or not will require the actuarial valuation of the level of business that the company can write. I am not sure what happens, if anything, when the sales goals are determined placing too great a financial strain on the company's ability to write the desired levels of new business. Let those companies that have faced the question please stand up and make a contribution of answers. My point here is only in drawing attention to the actuarial involvement and interest.

Our experience in working with long-range plans has revealed that it is very difficult for a service department, such as the actuarial, to measure performance. The one that we have found most effective has been to utilize timetables for project work. There is a certain nicety to productive line operations which develop measurable numbers for performance, such as units per day, people per week, and the like. By contrast, a service or responsive department must base its plans on the anticipated input from other areas. In fact, we carefully cull through the long-range plans as expressed by other departments and divisions within the company in order to assess what we can expect in the way of future work loads. No matter how good the attempts are at communicating this information, we can always find areas of omission.

My own personal opinion is that the long-range planning process will assist in setting the timetables against which performance will be measured. Plans need to be made that will recognize at least two major areas of required activity—the first, in response to other areas, and the second, those work items or projections that the actuaries feel are required for the effective corporate development. An example of the first is responding to a request for the financial evaluation of the new agent-compensation plan. An example of the second would be the actuarial research necessary in determining whether a reserve-strengthening process should take place in some area of the business. These, I think, are obvious examples, but each individual can pinpoint those which most apply to his company's operations.

Time is a commodity that can be measured. On the other hand, time is a commodity that cannot be modified. In contrast, the effort of people, also a measurable commodity, is elastic. Within a given span of time, a greater or more efficient effort will produce a larger amount of production. This is recognized as one of Parkinson's laws, wherein it was stated that work will expand to fill the available time. Nevertheless, for the long-range planning process, performance as a function of time should supply standards for comparison.

By the way, I would refer you to the remarks of Mr. Philip Dutter, who spoke at the Society's Annual Meeting in October of 1968. He treats this subject of *measuring performance against goals for individuals in the professional/technical category*. I recommend his remarks.

When we began long-range planning, one of the areas considered had to do with "fail-safe" procedures, the anticipated reaction to adverse or catastrophic events. For example, we could briefly dispose of the question of nuclear warfare, since this event was of such a catastrophic nature that very little could be done of a constructive nature in anticipating it. Record protection, of course, was discussed but, beyond that, very little.

On the other hand, we could and did consider the results on our company's operations if the economy were to suffer a depression. We looked at some of our products and procedures and tried to evaluate the impact of this particular event. Moreover, we tried to determine whether there was anything we could do currently that would mitigate against the company's suffering unduly should such an event occur. These questions were treated in the nature of "What if . . . ?" It is very much like having on hand a set of contingency plans with thought out alternatives so that reactions need not be made in time of stress.

Another area of benefit in the long-range planning process involved what we called "strategic planning." Here, groups of responsible officers were set up as committees to look at specific issues. Should we, for example, take advantage of certain liberalizations in the Massachusetts Insurance Law that would permit us to become involved in other associated types of enterprises? Should we, for example, enter the mutual fund market and, if so, under what conditions? These questions and others were evaluated and decisions reached concerning the outcomes. This is not a static process and is one which is still going on well after the corporate planning process has been established.

#### *Atlanta Regional Meeting*

MR. MORRISON H. BEACH: In these times of very rapid change, individuals with the technical training of an actuary, and the desire to do

so, have an unparalleled opportunity to go well beyond the traditional role of the actuary—to participate in the establishment of corporate goals, in the development of corporate policy, and in measurement and management at every level of the organization.

The life insurance business is going through a period of accelerated change. We are introducing new products. We are introducing new concepts of service. In fact, rather than simply marketing products, we are now marketing services. Instead of talking about life insurance, annuities, health insurance, we are talking about insurance and financial services and the financial planner.

The introduction of new services reduces the value of past experience; the introduction of new methods of operating emphasizes the need for forecasting. Management is looking for road maps which indicate, rather definitively, where a company's current policies and programs are leading and how long it should take for goals to be achieved. Without such maps it is impossible to measure day-to-day performance and to be sure that adequate resources are being allocated to those programs which are vital to a company's future success. For the next few minutes I am going to talk about three of the newer ways in which actuaries' skills can be applied in our industry: planning, measuring performance, and evaluating acquisitions.

#### PLANNING

If we define our business as providing insurance and financial services to the nation's families and businesses, I do not think that there is any doubt that the 1970's are going to offer us greater marketing opportunities than the current decade. At the same time, we are going to be faced with greater competition from noninsurance businesses than we are facing today. Our problem, therefore, is to make certain that future plans provide for the full and effective utilization of our companies' human and financial resources, so that we can capitalize on our marketing opportunities. This is one area in which I see an opportunity for a broader application of the actuary's skill.

The common measure of the effective utilization of capital resources is the rate of return which is generated on capital and surplus funds. Approaches which are rather traditional for the actuary can be very effective in quantifying and evaluating marketing plans and strategies in terms of the profits which they may generate in future years. At The Travelers, our operations are continually adjusted on the basis of the projections of

- a) future dimensions of the insurance markets;
- b) agency projections;
- c) future manpower requirements, for both sales and servicing;

- d) cash flow, with its implications for investment and policy settlement; and
- e) projection of profit and loss statements for each of the next ten years.

#### MEASURING PERFORMANCE

These projections are based on a tremendous amount of data and are developed in such terms that they are useful in measuring performance. We can measure, for example, the impact of changes in investment returns, new sales, persistency rates, agent turnover, and many other of the important elements of performance.

These projections are also at the heart of our expense management operations. As pricing is being considered critically, in Washington and elsewhere, our ability to manage our expenses, using fewer of our customers' premium dollars for expenses, is becoming more important.

It is quite apparent that the actuary's training provides the technical basis for the development and operation of this important management function. Whether the mathematical models that we use are asset shares, operation research, or simulation techniques, they are all grounded in actuarial methodology. No one is better qualified by training than the actuary to perform the *planning and control* management function.

One of the most difficult and yet most important responsibilities of management is to measure performance. It is vital that individuals or departments being rated recognize that the rating is objective to the extent that it can be. My company has recently approved a qualified stock option plan, and we are in the midst of attempting to find as many objective measures of performance as we can. The insurance business has been frequently characterized as one of limited opportunity, low risk, and low pay. If this was ever true, times are changing. By the introduction of incentives which have their bases in terms of quantifiable results, we are trying to introduce a greater element of opportunity for personal achievement, for higher risk and higher pay. We are defining the scope of the responsibilities of our management group, and we are trying to relate them, as far as possible, to the basic parameters that we use in our financial projections. Sales growth, persistency, unit costs, and mortality ratios are but a few of the quantitative measures. Of course, there are also some qualitative aspects which are equally important, such as quality of service. The important point is this: If we want to stimulate and reward accomplishment, we must have ways to measure that accomplishment. And this is where you, as actuaries, come in.

#### ACQUISITIONS AND MERGERS

One significant implication of the expanding concept of our business is that, to provide the total range of insurance and financial services which

we believe it is appropriate for us to market, we must take one of two courses. We must either organize or acquire businesses which involve skills related to, but somewhat different from, those we have within our organizations. This involves the whole subject of evaluation for acquisition and, following acquisition, the supervision from corporate headquarters of autonomous and semiautonomous subsidiaries. In many cases, it might be desirable to leave the subsidiaries substantially independent; yet they have to be made responsible and responsive to the needs of the total organization. Here a "management by objectives" technique is probably the best answer. The management of a subsidiary is requested to develop a forecast of future results in sufficient detail that performance can be measured against the forecast. This forecast can then be evaluated to ensure that it produces an attractive rate of return on the parent company's investment, and performance can be measured against forecast as a basis for an incentive-compensation program. The parent, of course, retains control of the flow of capital expenditures. The price of continued autonomy is performance, and this provides a high level of motivation to the management of the acquired company.

#### CONCLUSION

If we can judge from recent papers and discussions, we actuaries are becoming involved in these important areas. We are applying more and more of our actuarial techniques to quantifying and evaluating the operations of the companies with which we work. But, in applying our training and our talent, we should ask one important question: Do we want to be technicians or tacticians? You can go only so far in quantifying results. Even a company's pricing policy, balancing profit margins against volume of sales, can be quantified only so far. In the final analysis, whether to buy a company or not involves the subjective evaluation of possible synergistic effects. If we can add to our quantitative skills, sensitivity to change, social awareness, political perception, and marketing perspective, we can make tremendous contributions to our companies' success and to our personal sense of satisfaction. In going beyond the quantitative, we will make mistakes, but they will be mistakes of action, the mistakes of leadership, the mistakes of achievers.