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THE WORK OF THE ACTUARY IN THE FUTURE

Moderator: GEORGE R. DINNEY.

Panelists: JAMES J. MURPHY, JEFFREY D. MILLER, MICHAEL R. TUOHY, FREDERICK KNOX

1. What are the unique skills that make an actuary?
2. What developments (sociological, economic, demographic, etc.) are likely to impact the work of the actuary in the future?
3. How will/should these developments change the way the actuary performs the roles and functions he has traditionally performed?
4. What new roles and functions do these developments open up for the actuary of the future?

MR. GEORGE R. DINNEY: Your panel for this Concurrent Session titled The Work Of The Actuary In the Future, includes four actuaries, each of whom will address himself to the main subject matter of this session, as well as providing his own special insight on a particular aspect of the subject.

The panelists are:

Mr. James J. Murphy: Jim's special insights are of two kinds. Firstly, he is a future-minded actuary who will cast a scenario as a background for the presentation. Secondly, he is Education Chairman of the Society and he will have observations on the implied question of how the Society's educational process is adequately preparing the actuary for his future work.

Mr. Jeffrey D. Miller: Jeff also has two special insights. As a younger actuary he has a longer time horizon than some of the rest of us. So he may be expected to have his own ideas as to the suitability of the actuary's training and education in relation to his own experience. Quite apart from this actuarial perspective, Jeff is also qualified as Certified Public Accountant, so he may have some interesting observations as to the division of responsibilities between the actuary and the accountant, particularly as accounting methods have changed.

Mr. Michael R. Tuohy: Mike's special insight relates to the work of the actuary on the international scene. He spent his formative years in England and is qualified as a Fellow of the Institute but, in addition, Mike has had substantial experience in South Africa. He now resides and works in the United States. Some of you may share my long-held impression that actuaries in the United Kingdom have been trained more rigorously than actuaries in North America and that many United Kingdom Actuaries, by reason of their training and opportunity, have found their career work in fields that are alien to the traditional actuarial occupations in the United States and Canada. If there is any substance to the belief that foreign actuaries are expanding their field of work, this would be of considerable interest in our discussion of the work of the actuary in the future.

Mr. Frederick Knox: When I spoke to Fred about his participation on the panel and suggested to him that all of the panelists would have a special quality or characteristic that could bring a unique insight to this subject, Fred agreed. He said he recognized that his fellow panelists had special characteristics or qualities and he wanted me to say that the special quality he brings to this discussion is omniscience. This is by way of introducing Fred as an actuary who has long had a lively interest in this subject and who continues to hold his own unfettered opinions. Fred will have the privilege, as final speaker, of commenting upon this subject at large.

By way of leading in to this subject, some actuaries might consider the theme to be a begged question and might suggest the theme could more appropriately be presented as The Work (if any) Of The Actuary (if any) In The Future (if any). Perhaps the essence of the subject before us lies in our individual, and collective, sense of what the word "actuary" means - or what it should mean. In this regard, the formal education process, in all of its manifestations, is of critical importance.

Does the word "actuary" define a collection of unique skills, such as to satisfy the dictionary definition of "profession", namely

"The occupation, if any, not purely commercial, mechanical, agricultural or the like to which one devotes ones self; a calling in which one professes to have acquired some special knowledge used by way either of instructing, guiding, or advising others or of serving them in some area."

This definition is a double-edged sword. If, as some people say, the actuary is nothing more than a business mathematician, then we would seem to fall in the first category of "purely commercial, mechanical, agricultural or the like" which would mean that the actuary is not a professional. If we fall into the second category, what are those unique skills or special knowledge that make us professionals? Clearly, the issue of the professionalism of the actuary has significant bearing on the nature of our work in the future.

I have had the opportunity to discuss this subject with two professors of actuarial science at the University of Manitoba, Ernest Vogt and Elias Shiu. We discussed, without final resolution, the question of whether the actuary is a generalist - in my terms a "disciplined problem solver" or whether a narrower definition of "actuary" is necessary to qualify him as a professional, and so prepare him his work in the future. We also discussed the formal education process. Is the curriculum faced more towards the past than towards the future? Does specialization of the curriculum and the examinations de-limit the sphere of the actuary or does it support his claim to professionalism? Are the mechanics of the examinations themselves anachronistic? Do we spend too much time teaching technical processes (such as interpolation methods) that have been superseded by calculator programs? Do we spend too little time on those few fundamental aspects of actuarial science (such as general reasoning) that distinguish the actuary from most other practitioners of arithmetic and mathematics? The question that arises is whether our educational process makes it impossible for the actuary to distinguish obscurity from profundity.

MR. JAMES J. MURPHY: What is an Actuary?

Most actuaries find this a very difficult question to answer. The Institute

of Actuaries defines the actuary in terms of his "essential function to apply mathematical theory of probability, theory of compound interest and statistical techniques to all manner of practical problems." These practical problems almost invariably involve the provision of financial security in the face of uncertain risks. The actuary's job frequently involves striking a balance between the basic desire for certainty/security and the basic fact that life is full of risks.

An actuary might be described as a professional (we must not forget that word in any real definition of an actuary) in the application of actuarial science. The words "professional" and "application" imply a career involving an "art" as much as a "science". From the science viewpoint, I have heard it said that the actuary is a product of his unique educational background. This is not necessarily all positive as we consider the future of the actuary. But more on that later in this discussion. For now, let's just note that the future of the actuary may depend on an increasing emphasis on the "art" of the profession, without decreasing the importance of the "science".

In my memory, one of the best definitions of an actuary was given by Mr. Fred Kilbourne at the 1978 Joint Meeting of the Society of Actuaries and the Casualty Actuarial Society in New York. He said, "An actuary is that professional who is trained in evaluating the current financial implications of future contingent events." This definition encompasses in a concise manner most of the concepts I have already described - professionalism, education, financial security and risks.

However, as we look to the future of the actuary, I think this definition probably can use some modification and I'll say a little more about that at the end of my presentation.

Future Factors Affecting the Work of the Actuary

Change, and an ever increasing rate of change, in every aspect of life will be the key factor affecting the work of the actuary in the future. Five areas of particular impact which will affect the actuary come to mind:

1. Economic. We have seen tremendous change in the economic situation over just the last few months. Inflation is becoming a critical factor. Traditional investments and earnings relationships among various investments are being questioned. All of this has to have an impact on financial security. The direction the economy will go in the future is anyone's guess.
2. Physiological. Two key risks that actuaries deal with involve mortality and morbidity. We may see significant changes in mortality and morbidity patterns in the future. "Squaring" the mortality curve, or even extending the maximum lifespan, have been discussed more and more among actuaries and non-actuaries alike. Changing patterns of public attitudes with respect to health maintenance and preventive actions, including holistic health concepts, will have an impact.
3. Sociological. Social relationships seem to be changing too. The importance of the family has been questioned. The responsibility for overall financial security is changing. We see more and more two income families, for example.

There is also the changing public view with respect to "rights" versus "privileges". This is perhaps seen in an ever increasing expectation for governmental social programs and employer benefits. These trends are currently being countered by an increasingly conservative attitude with respect to governmental policy. Which way will the future go?

4. Psychological. The faster pace of change will bring with it greater feelings of uncertainty in more and more areas of life. This should increase the need for individuals who are trained to deal with uncertainty. However, it may also increase feelings of skepticism regarding anyone's ability to deal with the uncertain nature of the future.
5. Political. Government seems to be growing at a faster pace as well, both in terms of governmental programs and regulation of human affairs. Continuation of this trend will increase the need for, and complexity of, actuarial work both within and outside government.

Future Work of the Actuary

Without getting into specifics, let me briefly discuss what I see with respect to the future work of the actuary. I see an expanded role for actuaries involving new risks that we have not dealt with before, involving new aspects of some of the old risks that we have traditionally dealt with, and involving non-financial applications of our expertise. There will probably be a need for more basic research to help deal with the new problems of the ever changing environment and to provide methods which the actuary can use to deal with the future and its faster pace of change. There will probably be an expanded public role for actuaries. This will involve not only increased regulatory activities but also basic application of actuarial science to the increasingly complex problems associated with governmental programs. We will probably see more and more specialization as the need for actuaries grows in several areas. New specialties such as that of the futurist will arise. And the traditional specialties will change, at least in the way in which the actuary evaluates the traditional risks. Actuaries must give greater and greater weight to the ever changing future. We cannot continue to assume that the future will be essentially just an extrapolation of the past. We actuaries must build into our "actuarial structures" a flexibility for responding to future change, not presently known.

We can't really know precisely what the future work of the actuary will be. There are too many possible paths which the future could bring. However, we can try to do a better job of preparing ourselves and future actuaries for whatever the future may bring. In this way, all actuaries can increase their capacities to take a proper role in the future, any future.

Education of the Actuary

As Education Chairman for the Society's Education and Examination Committee, the aspect of our discussion today that interests me most is the education of the actuary in the future. In discussing the definition of an actuary, I noted that the actuary is a product of his unique educational background. The emphasis of that educational background has been on the use of the past as a primary guide to present and future decisions. This reflects essentially a static view of the world with little recognition of an ever changing future and the alternative courses which that future might take.

One might characterize the actuary resulting from this system as one with both feet grounded firmly in the past and both eyes focused primarily on the present. This is not a good approach for preparing today's actuary for the uncertain future ahead of us.

Wil Kraegel, Chairman of the Society's Committee on Futurism recently said, "The actuary of the future needs to have one foot in the past, one foot and one eye on the present, and one eye on the future". This should be the goal of our educational process.

If we can say one thing with certainty about the future it is that the future will not be the same as the past, or the present. Human affairs are no longer relatively static, but dynamic, changing at an ever faster pace. This fact must be stressed and exemplified in our educational system. This needs to be done both in our Education and Examination system, as we train new actuaries, and in our continuing education system to prepare today's actuaries for the future. The past is still important, but we must apply our knowledge of the past in a way that takes into account future alternatives and their consequences. In other words, we must provide a more dynamic view so that the future "products of our educational system" are actuaries prepared to deal with the future.

Those of us involved in the Education and Examination Committee are trying to move our E & E system to recognize the need for a dynamic, future-oriented educational approach. What we teach must help the actuary to better recognize and reflect the future in his work. And the framework in which we teach it must be flexible so that it can more easily be changed within itself to reflect our ever changing environment.

The new syllabus, which will be fully in place in 1981, has been designed to provide such a flexible structure. It can flow with future changes in an evolutionary way, hopefully avoiding the need for major restructurings in the future. In addition, recognition of the future will be an ever increasing part of our educational materials, as a continuous revision process takes place within the new and flexible dynamic system.

Conclusion

Let me conclude by returning to Fred Kilbourne's definition of an actuary. I'd like to modify his definition to give better recognition to the actuary's need to look to the future, and to continue his recognition of the actuary's training being at the heart of his uniqueness. As a result, I would come up with the following: An actuary is that professional who is trained in evaluating the current and future financial implications of future contingent events within a dynamic unpredictable environment. With an overall education system which results in this kind of training, we will all be better prepared for the expanding opportunities of work for the actuary in the future.

MR. JEFFREY D. MILLER: Mr. Jim Murphy has discussed the broad view of the work of the actuary in the future, and also, the education of the actuary in the future. My charge is to discuss these subjects from two perspectives: first, that of a young actuary; and second, that of an actuary who is also trained in accounting and, in fact, has spent some time as an auditor in a CPA firm. I'll take advantage of my youth and present some relatively novel viewpoints on these subjects, recognizing that the wiser, more experienced, actuaries will treat me compassionately if my ideas are hopelessly naive.

The Definition of An Actuary

I would agree with Mr. Kilbourne and Mr. Murphy that the actuary's training is at the heart of his uniqueness. Further, it is the sole province of the profession as a whole to establish this training. But it is the responsibility of the individual actuary to put it to the most proper use. If, as has been stated before, this training is so important to the uniqueness of the actuary, then I would propose that we define an actuary in terms of his training. Quite simply, I would define an actuary as one who is trained in actuarial science. If we can then define actuarial science, we have succeeded in defining an actuary. In my view, actuarial science is that body of literature that has been put forward by actuaries collectively. Such material is contained in the syllabus for the actuarial examinations and in the Transactions of the Society of Actuaries and its predecessor organizations. Since actuarial literature will continue to evolve in the future, so too will the actuarial profession, and the roles which actuaries will play in society.

What does the Definition of an Actuary Mean?

For a young actuary, this definition serves two functions. First, it puts into perspective the material he has studied. Secondly, it presents the challenge for his future activities in the profession.

In preparing for the examinations, an actuarial student becomes acquainted with actuarial science. He learns that portion of the literature which more experienced actuaries deem to be the most important and most basic to his qualification as an actuary. Only by learning this material can one be qualified as an actuary in a professional sense. Since the body of knowledge which is actuarial science is often different from the occupation our members choose, so also the qualification process as an actuary may be completely separate from the occupation of a student.

As the actuary completes his examinations and looks forward to his career as a professional, the definition of an actuary helps present his challenges for the future. After studying actuarial science, as it has evolved over the past, the young actuary can recognize that the path for the profession in the future will be substantially determined by him and his contemporaries. Further, he can use the qualification of an actuary, with its reputation established by his predecessors, to create new opportunities and address new problems, thereby creating a broader perspective for actuaries of the future.

Future Work of the Actuary

Mr. Murphy has discussed the developments which are likely to affect the actuary in general terms. I will merely add some of the functions I would like to see the actuary serve in the future. These new functions are really nothing more than dreams, but dreams are the first step in any accomplishment.

First, in a sociological area, technological progress will place more tools at the disposal of the actuary, particularly computers. These tools will be a bonanza for some and a nightmare for others. I believe that many actuaries in the future will be highly conversant with computers and make valuable contributions to the application of the machines in accomplishing their ultimate task. Increasing roles of government will force the actuary to become more of a political animal than he has ever been. I would hope to

see actuaries take an active role in government, not only in offering technical advice, but also in running for political office.

Secondly, developments in the economic area will affect the actuary in the future. Limitations on natural resources, which have become apparent, and recent declines in productivity indicate that increased application of the principles of operations research is needed in many areas. In applying these methods, the knowledge of business and mathematics possessed by many actuaries could be highly valuable. To the extent that traditional actuarial training can be shifted partially from financial analysis to operational analysis, our profession will be able to make a contribution in this important area. If economic policies of our governments continue to be ineffective, I would hope that some in the actuarial profession will begin to study political economics and possibly offer some new ideas. Such study could be encouraged by a more detailed treatment of this subject in the examination syllabus.

The third area of developments which will impact the actuary of the future is that of demography. Major changes in mortality, morbidity, and public health patterns will certainly impact on the actuary's traditional role. Since many of these changes were not foreseen adequately and, therefore, not provided for in our calculations regarding long-term financial risks, the funding schemes we have designed in the past may turn out to be inadequate. I hope the profession will admit to these errors and use them to demonstrate to the public the importance of accurate planning and the long-range consequences of economic decisions.

The final area of development which will affect us is the political arena. We have seen massive political upheavals obliterate the economic plans which have been made recently. While prediction of these developments is certainly beyond the scope of our training, evaluation of their potential impact is not. I would agree with Jim that our profession should become well schooled in the art of "what if" games.

Conclusion

In conclusion, as a young actuary faces the future, the outlook for society as a whole may be cloudy at best. However, in my view, the outlook for the professional actuary has never looked brighter. We face our challenge with comprehensive training in the ways of the past, and with a profession which is young and flexible enough to adapt to the future.

The Actuary and The Accountant

The second area which I have been asked to comment upon is the relationship between actuaries and accountants. In examining this relationship, I believe that much can be learned about the development of our own profession. While I consider myself exclusively an actuary in these debates (in fact, the AICPA may drum me out if they read this RECORD), I have had some exposure to the other side of the fence.

Earlier, we defined a profession in terms of its training and literature. In my view, the actuarial profession is substantially ahead of the accountants in this aspect. As the accounting profession has grown larger, they have fought major battles in policing their own competence. At least in my experience, this has not been a major problem for the Society of Actuaries.

However, despite their problems in education, the accountants have been as successful as any other profession in defining their occupational role and communicating their competence at that role to the general public. As a result, the practice of their profession has become highly lucrative financially when compared to the degree of training it requires. In short, they have become a public, political profession. In my view, the actuarial profession has a long way to go in order to approach the accomplishments of the accountants in this area. Perhaps much of this success in the public arena has resulted from publicizing a single, public role - the issuance of an independent audit opinion. Obviously, the actuarial profession has not been as successful in establishing such a simple, universal function.

As the accountants have gained public prominence, they have been quick to expand their services. They have extended the scope of their practice to include areas requiring the training of other professionals. These include the employment of lawyers, management consultants, data processing specialists, employee benefit consultants, and, yes, actuaries. Just as any other good businessmen, the management of the large accounting firms will continue to expand their practice in these non-accounting areas as long as they are profitable.

Further, in recent years, the accountants have attempted to gain influence with government regulators. These efforts have been particularly noticeable when regulators have been forced to develop regulations which define public competence. Some examples are the in-roads made or attempted by the CPA's in the areas of life company financial reporting, certification of casualty loss reserves, and audit requirements for pension plans. In these areas, the accountant has been acutely aware of society's increasing dependence upon big government, and they have made every attempt to influence the government in its efforts to legislate competence.

It seems that our profession faces a clear-cut choice in light of these developments. We can ignore these political developments, and continue to concentrate all of our collective efforts in the areas of education and research. If we choose this route, then any political or economic advances made by our members will be made individually or as members of other groups. The other choice is to begin communicating our role, as we see it, to the public collectively. We will then begin a long, up-hill battle to gain some measure of public prominence which can be used to advance our own interests independent of the accountants, the insurance industry, or anybody else.

As you can probably tell, the public in-roads made by the CPA firms into actuarial areas of expertise are disturbing to me. I believe these advances are particularly alarming in light of the degree of training required to understand actuarial science. However, our services must be identified to the public in some manner. If our profession chooses to stay out of the public arena, then we have no gripes against the accountants or any other of our employers. We can only hope that our thoughts are solicited when our expertise is needed. If we choose to go to the public with our talent, then we have declared an all-out war against the accountants or any other group that tries to exploit us. I only hope that if we declare an all-out war, we will have an all-out war effort from a large portion of our members.

Conclusion

This session, along with many others presented by the Society of Actuaries, will tell us that many challenges face the actuary in the future. These challenges result not only from the many problems which face our countries as a whole, but from the growing pains we are experiencing as a profession. The challenges of the future will affect every actuary regardless of his age. Only if we anticipate these challenges and address them today, do we have any hope of conquering them tomorrow.

MR. MICHAEL R. TUOHY: Unlike my crystal-balling colleagues, my remarks will cover a much narrower subject, namely my observations as to the similarities and differences between the North American actuary and his counterpart in the United Kingdom. For those of you not familiar with the U. K. scene, it would probably be helpful if I took a minute to give a brief description of the actuarial structure in the U. K.

There are two actuarial organizations - the Faculty of Actuaries and the Institute of Actuaries. The Faculty is the Scottish organization and most of its 560 Fellows reside in Scotland. Generally, actuaries elsewhere in the U. K. are Fellows of the Institute. The two organizations work closely together and, although my remaining remarks will refer only to the Institute, they would apply similarly to the Faculty.

The examination syllabus of the Institute covers similar ground to that of the Society, with the exception that one of the ten exams relates to casualty work. This casualty exam was first introduced in the early seventies. Traditionally, U. K. casualty companies and Lloyds have used actuaries only sparingly, if at all. The trend now is for greater actuarial involvement, particularly in the larger casualty companies, but progress is slow and there still remains considerable reluctance by many people in the casualty insurance industry to see any need for actuarial involvement.

For those that began their student life prior to June 9, 1975, associateship of the Institute is achieved by passing the first six exams and fellowship by passing the remaining four. The rules were changed for later students and an experience requirement introduced, whereby all ten exams have to be passed to attain associateship status and fellowship is granted after four years of practical actuarial experience, of which at least two must be subsequent to completing the examinations.

In general, the progress of a student through associateship to fellowship is similar in the Institute as in the Society. Also, the Institute itself performs similar functions to those of the Society and the Academy. However, there are differences, and it is those differences, where in my view the U. K. has the edge, that I wish to discuss.

There are, of course, areas where the reverse is true. If I were delivering this talk in London, I would probably include such topics as profit testing, projecting, business planning and generally looking at the life insurance industry from a businessman's viewpoint. These are areas in which I consider the North American actuary to be well ahead of his British counterpart.

My first topic is the style of examination. Typically, the last four Institute exams consist of two three-hour papers, each paper containing either three or four questions. The questions are aimed more at whether the

student understands the broad principles of the subject rather than whether he knows certain nitty-gritty facts. Given the broad understanding, he is generally able to solve the problem posed. More questions are included in the earlier exams but in no case is the multiple choice method of questioning used. I feel the Institute's method of examination encourages more the problem solver and the Society's the regurgitator of facts. I appreciate that the mechanics of grading Society exams is much simpler and less subjective than those required for the Institute exams and also that most actuaries mature after their exam taking career has finished and, hence, the type of examination has little influence on their later capabilities. However, I have noticed among some actuaries in this country a great facility for knowing the details of the many rules and regulations that govern the U. S. insurance business but not too great a facility for questioning the purpose of such rules.

The second difference relates to spheres of activity. The 1979-80 Institute of Actuaries Year Book showed the number of Fellows and Associates resident in the U. K. employed in various broad categories of work in 1955 and 1979.

INSTITUTE OF ACTUARIES
U. K. RESIDENT ACTIVE FELLOWS AND ASSOCIATES

<u>Sphere of Activity</u>	<u>1955</u>		<u>1979</u>		<u>Annual Percentage Increase</u>
	<u>Number</u>	<u>Percentage</u>	<u>Number</u>	<u>Percentage</u>	
Insurance Companies	496	77.5%	1,234	66.0%	3.9%
Consulting	38	5.9	366	19.6	9.9
Government	37	5.8	33	1.8	(0.5)
Industry and Commerce	32	5.0	69	3.7	3.3
Stock Exchange	23	3.6	67	3.6	4.6
Other	<u>14</u>	<u>2.2</u>	<u>99</u>	<u>5.3</u>	<u>8.5</u>
TOTAL	640	100.0%	1,868	100.0%	4.6%

The April, 1980 edition of "The Actuary" contained comparable statistics for active Fellows and Associates of the Society.

SOCIETY OF ACTUARIES
ACTIVE FELLOWS AND ASSOCIATES

<u>Sphere of Activity</u>	<u>1964</u>		<u>1979</u>		<u>Annual Percentage Increase</u>
	<u>Number</u>	<u>Percentage</u>	<u>Number</u>	<u>Percentage</u>	
Insurance Companies	1,712	77.8%	3,894	60.5%	5.6%
Consulting	352	16.0	2,192	34.0	13.0
Government	53	2.4	183	2.8	8.6
Academic	23	1.0	83	1.3	8.9
Other	<u>62</u>	<u>2.8</u>	<u>88</u>	<u>1.4</u>	<u>2.4</u>
TOTAL	2,202	100.0%	6,440	100.0%	7.4%

A comparison of the figures shows similar movements in the number of actuaries in insurance companies and consulting. One reason for the high proportion of consultants in North America may be the greater number of life companies per actuary, but I suspect the definition of consultant is not consistent between the two surveys and several of those ranked as "consultant" in the Society would be in the "Other" category in the Institute, for example those working with computer consultants. This would account for the sharp rise in the Institute "Other" category, as I am not aware of any significant movement of actuarial manpower into non-traditional fields, unless investment is considered non-traditional.

An interesting comparison is the movement in the government employee figures with the Society numbers increasing faster than the average and the Institute's numbers actually decreasing over the period, admittedly from a high starting figure.

The Institute's category "Industry and Commerce" is misleading as the majority of those included are either responsible for the actuarial work of the large pension funds or are responsible for the investment of such funds. If the latter group were combined with those working at the Stock Exchange and those employed by investment bankers included in the "Other" category, the proportion of actuaries involved directly with investment would exceed 5%. In addition, most life assurance companies' investment departments are heavily populated by actuaries. If these were included the total proportion of investment actuaries would probably fall in the range 15-20%.

This is a major area of difference and I believe that the North American life insurance industry has suffered from the lack of actuarial involvement on the asset side of the balance sheet. There is now more than ever before an excellent opportunity for actuaries to become involved in the management of assets. Too long have actuaries concerned themselves with the liabilities given an earned interest rate based on assets held at amortized cost. Too long has the investment people's objective been to achieve an acceptable yield with little or no thought being given to the term of such assets, because cash flow is always positive. So the story went until late 1979. The steep rise in interest rates followed by the sharp increase in disintermediation by way of loans and surrenders focused attention on market values and brought home the fact that most life companies were horribly mismatched. The need for actuarial involvement in the investment of the assets is currently perceived and we should do all we can to satisfy that need. Initially, I envisage more involvement in the investment departments of insurance companies then spilling over into Stock Exchange firms who will see a need for an actuary who can speak the same language as the investment departments.

The final difference I wish to discuss relates to the official recognition of the actuary. My concerns are similar to Jeff Miller's; the actuary in North America does not have sufficient political clout, even in areas which should be his domain such as life insurance.

As long ago as 1909, it was required by law that an actuary sign off on the valuation returns of life insurance company in the U. K. The definition of an actuary in this context is a Fellow of the Institute or Faculty or any person who in the view of the Government Actuary's Department (GAD) has similar qualifications. The latter part of this definition is rarely implemented. Occasionally, FSA's and FCIA's have been allowed to sign off on North American branches in the U. K.

The prime responsibility of the actuary of a U. K. life company has always been regarded to be the protection of the policyholders. To this end the actuary has the responsibility of setting his own reserve bases and his own cash value bases. The regulatory authorities' confidence in the actuarial profession was borne out until the early 1970s when the first UK life insurance insolvencies of the century occurred. Since then closer supervision of the newer companies has been seen, but the actuary is still able to set his own bases subject to justification to the GAD. Regulations were introduced in 1974 which gave GAD the power to prescribe minimum valuation requirements, but none have yet been forthcoming.

There remains a very close association between the GAD and the Institute and Faculty. No major regulations will be put into effect without detailed discussions within the profession. Recent examples have involved appropriate methods for valuing variable policies and methods for valuing maturity guarantees on such policies.

During the general session which closed the recent Hartford meeting, Dale Gustafson made reference to the British disease of social democracy, which, looking at the overall performance of the British economy since World War II, is not an unreasonable description. However, the life insurance industry has remained buoyant throughout the period and has increased its market share of the savings pound. One of the principal reasons for this is the favourable tax treatment given to life insurance, but this is not the only reason. The lack of burdensome regulations has allowed the industry the freedom to introduce products in a timely fashion fitting the changing economic environment.

I would like to make reference to the U. S. disease which does not infect the whole economy, but is particularly prevalent in the life insurance industry. This disease is over-regulation, not only with respect to the number and extent of the regulations but also the number of regulatory authorities involved, 50 states, the SEC, the FTC. Under the weight of this onerous legislation the attitude of the industry appears to be how to beat the regulators rather than how to help them formulate sensible regulations. It would be interesting to trace back which came first, the attitude or the regulations.

I am concerned that during the next decade, when it is not unreasonable to expect movements in investment conditions similar to those experienced in the last year, the life insurance industry will be so over-regulated as to be unable to offer attractive enough products to remain a force in the savings market. The effect of this could have serious repercussions on the actuarial profession as possibly we could see a reduction in the number of actuaries employed by insurance companies over the decade. Interestingly, the three presentations dealing with the three futurist scenarios at the Hartford meeting envisaged a sharp reduction in the number of life companies over the next five years.

In conclusion, I am concerned as to the future of the actuary in the life assurance industry. Unless the profession can bring pressure to bear to relax the burden of regulations in such areas as guaranteed cash values, reserving bases, policy loan interest rates and variable policies, the use of life insurance as a savings vehicle may disappear and with it the demand for actuarial manpower will reduce in the insurance industry which currently provides employment for 66% of all Fellows and Associates of the Society.

MR. FREDERICK KNOX: We actuaries are fond of quoting Ruskin - the work of science is to substitute demonstrations for impressions and facts for appearances. But today, I'm going to be very un-actuary-like and substitute impressions for demonstrations and appearances for facts. And the reason I can shed my traditional role is because I will be talking about the future as it relates to the future work of actuaries.

For purposes of this presentation, I am using the term "Actuary" in its broadest sense to include all members of recognized actuarial organizations.

The future is our most precious resource. Its broad implications, its possibilities and its alternatives, are a major concern to most actuaries - particularly the younger ones who are trying to find their niche. The systematic exploration of the future work of the actuary is a most necessary effort. Various committees of our actuarial organizations, as well as sessions like this one today, help actuaries to see, choose, plan and shape their futures. When the future arrives, the time for us actuaries to decide what to do about it is long past. By that time, our control over it has been lost. To control the future, we must do so before the future is upon us. We must plan for it and set the forces in motion to anticipate it.

Today we respond to problems in a reactive fashion - flitting from one emergency to another and seldom ever solving any of them. The future requires us to anticipate potential problems far enough in advance to solve them - before they grow too large or we lose control of them.

All our systems, social, economic or political, are constantly changing. Most experts believe we are in a period of accelerated change. We as individuals, and our organizations, very seldom are aware of the changes that are taking place at the time they are occurring. However, we do see signals that come at us and we can only understand the signals if we see them as part of a systematic change.

If we see these signals one by one as they hit us, we will not understand them. We will tend to see each one separately and we will suppose there is some evil demon out there conspiring to undermine everything that we cherish and consider sacred. Often we become defensive and try to protect our tradition or historical position and, consequently, lose flexibility and adaptability to change. We know that this approach is not satisfactory. Change does cause stress and problems but it also creates opportunity for the present and the future. We must find ways to perceive these signals as inter-related and part of a systematic change. Then we can understand them and begin to take effective action to mold our future.

Actuarial services have always been needed because of our strong emphasis on the financial consequences of contingencies or uncertainties with respect to life, health and property. Actuaries deal with financial security protection whether through formalized insurance mechanisms or substitutes. Most products or schemes either protect income or assets. Income is protected by life, health and retirement plans and assets by property, casualty and life insurance programs.

With changes in concepts of classification of risk, equality, rights, competition and government involvement, income and assets still must be secured or protected today and in the future. The questions we must ask ourselves are: "How appropriate are our traditional actuarial models for measuring

and evaluating risk today and risk tomorrow?" and "Can actuaries adjust their tools and expand their know-how to accommodate change or will we blame those evil-demon accountants and MBA's for our lack of adaptability?"

Actuaries can fall into two categories - the star pitchers and the utility infielders. The star pitchers tend to be rigid and well trained specialists; actuaries who are highly trained in handling the past and present, but who cannot or will not move forward. They simply do not adapt well. They are the best at what they do, but they may overestimate their importance to the game. The utility-infielders, on the other hand, are not so specialized. They are the actuaries who adapt better to changing conditions. They can play several positions. They can see where they fit into the whole game, the whole picture. Actuaries with this kind of holistic approach to situations are needed.

The actuarial profession exists to serve organizations and institutions that provide financial security protection. Actuaries will have a future only as long as their services continue to fulfill those needs.

But what might that future look like? Let us review what is happening in the present that may affect the future. There is a vast array of insurance and financial security protection issues to cope with today and in the future. A list of some major issues would include:

1. ERISA
2. Cost comparison of insurance products.
3. Underwriting and policy cancellation limitations - concept of "take all comers".
4. Concepts of "entitlement" or "rights". That is, the right to full medical care, right to drive, right to insurance, right to affordable rates, and right to be reimbursed for every loss regardless of fault or cause.
5. Unlimited lifetime medical recovery for automobile and occupational accidents.
6. Increased cost of settling liability claims.
7. Captives, self-insurance mechanism and ASO's - schemes to eliminate insurance expense and keep cash flow.
8. Government's use of the insurance mechanism to finance social programs, such as FAIR plans, assigned risk plan, etc.
9. Provision of services in lieu of indemnification - HMO, prepaid legal and vision care.

The above list is only partial "litany" of the industry's woes.

If we can comprehend in a broad holistic manner these and other issues, we shall see many current and future opportunities that exist for actuaries.

For further discussion, I am going to classify these issues into the

following generalized categories:

1. Rights of individuals to a basic protection of their income, health and property at a "fair" and "affordable" price.
2. Choices of organizations for managing their "risk" in new ways to optimize their use of capital.
3. Options for insuring high or unusual risk exposures.
4. Choice of guaranteed services in lieu of monetary reimbursement.
5. Rights of government to choose methods of how best to use "transfer of payments" for social purposes.

For each of the above categories, different actuarial skills are required to provide for risk assessment, risk transfer and appropriate funding. Young actuaries should take note, and think about where they might fit.

For Category 1, basic coverages for income, health and property will be deemed "necessities" and their coverage rigidly prescribed. Prices will be controlled in some manner through regulation of rates, classes and/or profit margins. Most coverages will be mandated and companies must provide markets. Companies or organizations operating in these highly regulated markets will basically be "order takers" and not "risk takers".

"Order takers" will require high volume, low overhead, an efficient distribution system and relatively low capital needs. Actuarial needs for "order takers" will be well defined and somewhat limited. These organizations will have a strong marketing and expense control orientation. The actuary's role would be oriented toward acquisition cost, agency turnover, persistency studies and monitoring loss experience. I do not see many opportunities or a necessity for more sophisticated skills. These positions could be filled by a more ordinary type of actuary.

For Category 2, we are dealing with an ever-expanding and complex structure of self-retention, along with various schemes for organizations to manage and control their risk with the minimum use of capital. In this area, there are fewer restrictions and regulations and more opportunities for creativity. Different types of skills will be required. The actuary's role would be more akin to a consultant or an advisor. He will prepare alternative choices for the organization desiring his service. For this type of service, there is an almost infinite number of solutions, each with their level of desirability, depending on the uniqueness of the risk that is being protected. Many of the activities in this area would be one-of-a-kind, challenging actuaries in each and every situation.

For Category 3, insuring high or unusual risk exposures, we must include those things that could not be properly or appropriately covered in Categories 1 and 2. These risks can be unusual, like nuclear exposure risks, or have extremely high limits of liability, like aviation exposures. Risks in these areas will be greater and prices will be less controlled or regulated. Volume of business may not be as great or as important but profit margins would tend to be larger.

This area would also include the various reinsurance markets that exist today. Companies or organizations operating in this type of market will be basically "risk takers" and not "order takers".

"Risk takers" will provide new forms of financial security coverage. Old historical lines of insurance and the distinctions between life and property insurance begin to breakdown under the attempts of "risk takers" to cope with ways people and businesses need to secure their future. These insurers will operate through various distribution systems and will have a relatively large capital need.

Actuarial needs for "risk takers" will be less defined and could be boundless. The actuary's role would be oriented towards dealing with more complex statistical or mathematical technology, with a strong orientation towards financial concepts, such as capital allocation or budgeting. The opportunities for actuaries here, however, are greater in degree, but fewer in number. Also, the number of actuaries may be limited by the strong educational and training required to properly perform the services needed.

Category 4, refers to guaranteeing services as a mechanism for security. Actuaries have traditionally evaluated risk in terms of indemnification of loss in monetary terms. However, this is not necessarily the only way to assure financial security. It is very appropriate to provide services to prevent, or limit, a potential loss or hazard occurring as opposed to reimbursing an insured after an event or loss has occurred. The most obvious vehicle, today, is the HMO. The emphasis of the HMO is on preventive medicine with the hope that future medical utilization will be reduced. This concept can also be applied in other areas of risk protection and management through safety programs, fire prevention techniques, etc. Traditional actuarial models do not apply very well to these security mechanisms. For example, for HMO's the emphasis is on the type of population being served, services to be provided, potential utilization rates and adequate budgeting. Funding for this kind of vehicle is based on a capitation fee which in its most simplistic form is arrived at by dividing the total number of people to be served into the total budget for the services. The actuary's role here is oriented toward evaluation of cost trade-off's, budgets and monitoring utilization patterns.

Category 5, encompasses various social insurance programs and private programs controlled or regulated by state or federal agencies. Coverages in these areas come about because of basic social and economic needs for those who cannot afford insurance or who may not be insurable. Types of coverage and pricing will be highly regulated and controlled. Principles of social equity will dominate all pricing considerations. Private industry may or may not participate in providing these coverages. Associations or organizations formed to provide these kinds of markets must take all comers. The key issue here is how to finance or fund what would normally be a subsidized insurance mechanism through assessment, taxation, or other vehicles. The actuarial role in social insurance schemes will not be well defined. Actuaries must balance their thinking between individual equity and group equity concepts. They need to be innovative and creative in developing funding structures or rating structures that minimize the cost impact to the insurance industry or society and, at the same time, make the cost of insurance affordable to those who normally cannot pay the going price for the risk being insured. In order to perform effectively, they also need to be patient and understanding of the situations that bring about the need for these kinds of mechanisms.

For each of the above categories, the emphasis of the role of the actuary has changed. Some of these changes have been occurring for a long time and I do not want to imply that something radical has happened between last year and this year. There is still a large area of basic security protection being provided today to individuals and businesses where the work of the actuary has not changed significantly. In fact, if we could take a census of what most of us are doing today, we will find that a majority of us are functioning in what I would consider traditional actuarial roles.

Actuaries as a group are very intelligent, creative and talented. Many actuaries, either by education or experience, are working in roles other than actuarial. We should not confuse our role (or work) as "actuaries" with the many overlapping roles of many of our members. Let's not misinterpret this as a signal of change of the actuary's role.

The actuaries today and in the future have many opportunities. They may not be the opportunities we "usually" think of, but that is a signal that we cannot think "usually" anymore. The need for actuaries will remain. Our role as actuaries is still unique. Our challenge demands that we realize and understand how our role in that future is changing.

MR. DINNEY: One of the questions raised is whether the actuary is a generalist or specialist.

MR. J. MURPHY: I think the actuary is a little more of a generalist, ultimately, in that he has to bring together all that he has learned to apply to the problems - a disciplined problem solver as you called him. Our educational system is geared more to educating the actuary in a specialist role, primarily because there is more that actuaries are doing which just cannot all be covered in a satisfactory time frame. I see a dichotomy there. Maybe someone who is currently taking examinations may have a comment.

MR. ROBERT J. TIESSEN: I think it is very dangerous to be a narrow specialist. The changes in the industry are such that the division between areas of interest aren't there anymore - an example of this is the current trend to non-smoker policies and the blurring this causes between the underwriting function and the actuarial pricing function. Certainly within the insurance industry the areas of expertise an actuary must have is very wide.

MR. ROBIN B. LECKIE: I believe that actuaries are specialists, our training teaches us to be specialists and our body of knowledge is special. The profession is unique since we apply this special knowledge. I hope that we as individuals will apply this specialized knowledge in general situations and that we can look upon the means of applying that knowledge in a very general way. A profession that is based on a special knowledge with a general application is one that we should treasure. I think that all actuaries need not apply their special knowledge in a general way. For those who have a desire to be truly specialists within a special profession, that is fine - that is the way we will build up the profession. Basically our uniqueness is determined by our specialism.

MR. DINNEY: Do you think there is something in the training or educational process that uniquely qualifies an actuary to be a specialist? Fred talked about the utility fielder and the star pitcher, the generalist and specialist. Are there any processes which are imminent in our educational system which could qualify us as generalists?

MR. LECKIE: I don't know if there is any way to train a person to be a generalist. I am sure the MBA program says there is. I question it. I don't think an MBA is a generalist. I think all actuaries are specialists - that is what our FSA designation means.

MR. HARLOW B. STALEY: To the question of how do you train someone to be a generalist, I think the answer is that you train them in the fundamentals. Mr. Tuohy pointed out that North American actuarial exams tend to be too specific. In the U. K. they are less specific. I think our exams should be less specific if we are to develop generalists. In that regard, I have a suggestion for the Society examinations. The thing that is missing for actuaries is adequate training in the field of economics, including macroeconomics, microeconomics, and some knowledge of economic models. We overlook the extent to which the economists and actuaries have common interest. Their tools in many cases are the same, for example, compound interest, probability, and they each apply their expertise to practical problems. Through the field of economics, we could be expanding into broader fields that are being discussed today - including futurism, participation in government, and use of computers.

I also have suggestions for what to remove from the examination material. Let's remove some of the details of social security and social insurance programs.

MR. J. MURPHY: I think Harlow will be very happy with the new syllabus. We intend to have an exam, the new part 8, which will first be administered next spring, which is devoted entirely to the subject of economics and investments. It will include both micro and macro economics. We have felt for some time now that the economics side of the existing syllabus has been weak. Also, we are somewhat playing down the social security aspects of the syllabus. We will cover some basics of social security in part 6, and will cover further detail as necessary in the later exams - primarily for students concentrating on pension topics.

MR. PETER S. PALMER: This and other futurist sessions have concluded that the actuary has a tremendous contribution to make in non-traditional roles. I agree with this idea. I think the only way the actuary is going to get into these roles is if, under the sponsorship of the Society, actuarial talents were made available in these areas. It would obviously have to be funded by life insurance companies, unless we all want to pay \$250 annual dues. I think this is the only way the role of the actuary will expand, since all actuaries are, and will otherwise continue to be, absorbed into traditional roles.

MR. MICHAEL A. P. BECK: On the matter of the actuary as a generalist or specialist, maybe we are asking the wrong question. It is a question of perspective. Everyone lives in a sphere of some size and when you see people who work all over the sphere, they are generalists. When you see someone working in one corner of the sphere, they are specialists. But when you break outside the sphere, other people are looking at your sphere, and the sphere is very tiny. They say you are a specialist, whereas you always thought you were a generalist. I think the question that should be asked is "is the actuary a technician?" and I think the answer is definitely not. A technician is someone who works on something that is very specific and identifiable. The role of the actuary is not as specific and not as identifiable as that. We have difficulty identifying what we do.

MR. DINNEY: There is a book that belongs on everyone's business bookshelf titled "The New Science of Management Decision" by Herbert A. Simon. Simon is a multi-disciplined person, a professor of computer science at Carnegie-Mellon University. His background is first in economics, second in psychology, and third in computer science. The question I ask myself is why, with all the credentials actuaries have, actuaries as a group are not more on the frontier of change. The intriguing thing about Simon's book is that he identifies two kinds of problem solving techniques - programmed problem solving and non-programmed problem solving, which is what we call intuitive or human thinking. He makes the point that there is no real distinction between the two kinds of problem solving. The processes are the same. He advocates a scientific study to simulate or replicate what we now call human thinking. That is a most intriguing project.

MR. LINDEN N. COLE: I have been taking some Chartered Life Underwriter courses recently and some of the material would seem appropriate for the Society's syllabus. I would welcome more emphasis on non-life company taxation and non-life company investments.

MR. KNOX: As I recall, the Casualty Society is including the CPCU material more and more in their exams, which is a parallel to what you are suggesting.

MR. J. MURPHY: In reviewing the Society's syllabus, we have looked at some of the CLU material and texts. We are looking at "financial security programs" material, particularly taxation, and hope to get some of that material in early examinations on a broad basis, and perhaps some of it in more detail in later exams.

MR. DINNEY: Mike Tuohy mentioned in his remarks that the principal difference in the work of the U. K. actuary as distinct from his North American counterpart is the fact that many U. K. actuaries are involved in the investment area, either in the investment community or in the life company investment functions. The conclusion is that North American actuaries have concentrated too heavily on the liability side of the balance sheet to the detriment of the asset side. For instance, immunization is not common in North America.

MR. CRAIG ROBBY: The North American actuary is subject to more regulation than the British. We have to pay attention to allocation of investment income to lines of business. We can't just say there is a particular asset which is held against a particular liability because we have to pay attention to approved rules for allocation. For instance, New York has a set of approved rules and that precludes matching of assets and liabilities.

MR. TUOHY: Would approved rules in New York stop you from matching assets and liabilities?

MR. ROBBY: You have to choose your investment allocation rules according to investment year method or the portfolio method. You can set assets up in a separate account, but some states such as Minnesota, have very strict rules for separate accounts.

MR. TUOHY: I take your point that, because of the lack of restrictions in the U. K., actuaries have had a freer hand. One example of the problem in the U. S. is the Single Premium Deferred Annuity (SPDA) market and I don't think everybody has invested their SPDA funds in a very sensible fashion.

MR. ROBBY: No, I agree. A lot of the regulation is precluding reasonable strategies for the investment of funds. The major life insurance companies are investing in private placement type of securities and in this last market a number of insurance companies would have been technically insolvent if they had to value their assets, particularly private placements, at market value.

MR. TUOHY: Even if the actuary is not in the investment department, effectively he has a veto on the investment philosophy of the company. I get the impression that in product development meetings over here, assets are never talked about, whereas in the U. K. "where is the money going?" is part of the product development process.

MR. ROBBY: I think the investment philosophy in most companies is to get the highest return consistent with the quality of the investment. No attention is paid to investment term, which I agree is not a very sound approach.

MR. J. MURPHY: To relate this to earlier comments, this is really a topic for the future work of the actuary. The economy of the last few months has really brought us to question the viability of the bond market, for example, and the availability of sound long term investments at fair rates. So even if we were following a philosophy of matching, we would have to question whether we would even be able to always continue to follow that philosophy in the future.

This is one example of what we as actuaries must question. Is the recent experience an isolated event or will it continue to happen in the future. We have to be able to deal with whatever the future holds.

MR. ROBBY: The future of the actuary is not necessarily all that rosy when you look at what has happened to the savings rate in the last 6 months - it has dropped to the 3% area. The major activity of the life insurance industry is really competing for the savings dollar. Look to the future and you see a cloudy and very uncertain future for many life insurance companies, especially those with a heavy agency force.

MR. DINNEY: It is said that actuaries are in short supply right now in the U. S., but perhaps this is just a point in time phenomenon and there is an adequate or excessive long-term supply for actuaries in their traditional roles. Perhaps the educational process should look to expanding future roles for an actuary. Nothing has yet been said about the unique skills that make an actuary.

MR. LECKIE: I see a very great need for actuaries in activities that we are not now engaged in. One of the unique things that actuaries do is that we are asked to question things, to look at both sides. I'd like to relate that back to the previous discussion. I think I heard that because of the regulatory environment in the U. S., there is no necessary involvement on the investment side nor can there be a reasonable matching of assets and liabilities. Personally, I see just the opposite. I see a greater need for investment involvement in the U. S. because of the statutory requirements and because of the policyholder disintermediation possibilities. The statutory requirements are a magnificent discipline and I wouldn't give them up. On the other hand, there is nothing stopping us, having internal tools, notional funds, etc., from assessing whether our assets are appropriate to our liabilities in total, or in part. If we find that we are

basically mismatched, then that is telling me that we as actuaries have done a terrible job for our companies and our policyholders. We don't have to be mismatched in total and we should have a good idea of the risks we are taking when we do mismatch because there are times when you should be mismatched. This is an area where actuaries should be involved for insurance companies and for pension plans. It doesn't alter any adherence to statutory requirements - that's a basic discipline that will keep us solvent.

MR. MILLER: It occurs to me that we can meet and discuss what items the actuary should be speaking about and how we should expand our roles, but we're not going to expand our roles under current establishments until somebody asks us to. The actuary in an insurance company is not going to be asked for advice on the investment function unless the president instructs the investment vice-president to ask the actuary about something. So I think we get back to a political question - is our profession strong enough to assert our views? This can also be applied to the regulation area. We may be operating under some regulations that are absurd, but we also live in a democracy. Our regulations are controlled by legislators who are elected by the public. If the regulations are absurd, then our role as a public profession is to publicize the fact that they are absurd and try to change them. I think all the questions we're asking here relate back to our political role as a profession.

MR. KNOX: If you work as a consultant or for an employer of some kind, the test is really the trust your client or boss has in you. If he believes you can make a contribution on the investment side, you are asked to participate. The acid test is what you can really do and is there a need for what you can do.

MR. ROBERT MURPHY: A few months ago an investment officer asked me if I knew how to go about immunization. I reviewed published material and concluded that I could do it. Meeting a few days later with the investment officer, we ended up with a three-dimensional space with ten possible solutions to different problems. The investment officer indicated that this would not help him since he lives in a practical world and I had given him a theoretical model. I replied that if management were to instruct me to spend half of my time applying the model to make his decisions, I could do it. The reply was that management would not want that, therefore, in the U. S. I can't see this happening until we've had at least a few more crises.

MR. BECK: I must take issue with something that the previous speaker and Jeff Miller said about the actuary waiting until the investment people or the president ask for advice on investment matters until he does something in that field. I regard this as arrant nonsense. The actuary has a responsibility he cannot ignore. He must take time to draw attention to the asset-liability matching needs of the funds that he is working with. People can choose to ignore his advice. But unless he puts his advice on paper and thrusts it under somebody's nose he has only done half of his job.

MR. R. MURPHY: As long as cash flow is positive there is not much of a problem. Only when the possibility of negative cash flow arises does the problem come to a head.

MR. DINNEY: Mr. Beck touched upon an intriguing point. What is an actuary's product? Perhaps we could agree that what we produce is opinions. I asked one of our eminent consulting actuaries to look right through his job and

tell me what is it he does. He said spontaneously, "I guess I relieve apprehension." He gives assurance by giving his opinion.

MR. WALTER B. LOWRIE: I would argue for greater flexibility in the exams. We have talked about a number of directions that actuaries can go - computers, investments - and they seem like fertile fields. If an actuary could go to his boss and say look, I'm an expert in investments, his boss might ask him to go ahead and spend half his time on investments. If you assume that the exams are a vehicle for education in the Society, then the exams have to be made more flexible, with a smaller more manageable common core and a specialty that allows you to become really conversant with investments or computers. I feel this is the way the Society will be able to fill the broadened needs.