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PANEL DISCUSSION

REINSURANCE

Panel Members:

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1. Services provided by professional reinsurers in addition to risk-sharing.
2. The cost of conventional life reinsurance.
3. Life reinsurance pools.
4. Nonproportional life reinsurance techniques and comparison with reinsurance practices in nonlife lines, including health and accident benefits.
5. International aspects of reinsurance.

JOHN PHELPS:

The purpose of this session is to provide a scientific but practical examination of the role of reinsurance in our business. We have a distinguished panel which is experienced in this field. Each of the five topics listed in our program will be discussed by one of the panel members, after which there will be opportunity for questions and further discussion from the floor.

ROLAND F. DORMAN:

When reinsurance is mentioned, most of us think of the procedure whereby one company transfers part of a risk to another company. Providing the writing company protection on risks reinsured is the principal purpose of reinsurance, just as providing protection to individuals is the principal purpose of life insurance. It would be difficult, however, to find a successful life insurance company today that would admit to providing nothing but protection against certain contingencies to its clients.

A life insurance company desiring to do a complete job for its clients, whether they be individual policyholders or group contract holders, recognizes that their needs vary and provides a variety of facilities over and above pure protection to satisfy these needs in the best manner possible. There are probably few, if any, other industries that can match the insurance industry's dedication to providing services to its clients above and beyond its basic reason for existence. The life reinsurers have, as a matter of course, applied this same tradition of servicing to their

reinsurance clients. Just as on directly written business, the assistance provided clients by reinsurers plays a very strong supporting role to the basic function of providing protection against specific contingencies.

We are all familiar with the services provided by our companies to their individual or group clients, but what are those provided by life reinsurers to their clients? They are many and varied, depending upon the company's needs and its stage of development. Let us look at a few of them.

Perhaps the most common service rendered clients by professional reinsurers is assistance in appraisal of risks. This assistance runs from providing a large company with its own experienced underwriting staff the benefit of a second appraisal on certain risks to training and guiding the inexperienced underwriter of a small company. It is not necessarily limited to individual life insurance but may also extend to individual accident and health and group insurance.

The professional reinsurers are particularly suited to providing underwriting assistance, since the underwriting staff of most of them is well seasoned and exposed every day to almost the complete range of risk appraisal by virtue of the fact that it sees business from nearly the entire spectrum of the life insurance industry, both domestic and foreign. Without this assistance many companies would have to avoid acceptance of risks requiring experienced underwriting know-how to appraise properly or risks that might be classified as experimental in nature. Through use of the reinsurer's facilities, a company can gradually build up exposure and experience in the more hazardous risk areas while minimizing any danger to its own financial strength. This facility has aided many companies to grow and provide a more complete service to their agency force and the public.

The reinsurers can play an important part in developing sound underwriting practices within the industry as a whole. Their underwriting manuals are distributed widely throughout the industry, and many companies use these as a guide in developing their own underwriting rules. In addition, a company's underwriting executives become almost as familiar with their reinsurer's underwriting practices as their own through the discussion and exchange of opinions on specific cases submitted for reinsurance. The reinsurer must bear in mind that its underwriting rules may be followed by other companies and it therefore owes an obligation to its clients as well as itself to avoid unsound practices. It must also remember that, while its financial strength may permit a certain amount of flexibility in some appraisals, many of its client companies cannot afford the same degree of flexibility.

Companies with inexperienced claim staffs often need assistance in reviewing difficult claims and determining the best course of action to follow in resolving these claims in the manner most equitable to all parties concerned. The reinsurers, of course, have a selfish interest in assisting on claims involving reinsurance but are also willing to offer clients assistance on other claims as well. The reinsurer obviously cannot replace the ceding company in any claim negotiations. Any liability to the beneficiary comes directly from the ceding company and not the reinsurer. The final decision must, therefore, rest with the client company, and the reinsurer's role must be limited to advice and guidance. Many of the larger companies also check with their reinsurer on questionable claims, particularly those involving reinsurance. Often the reinsurer will have coverage on a particular individual through its own direct operations or other reinsurance clients and might have discovered information in its own investigation that was unknown to a client company. The reinsurer's advice and guidance in claim settlements may not only help the client company avoid payment of unwarranted claims but may also help the newer companies in developing a claim policy that is in the best industry tradition of paying all legitimate claims as quickly as possible.

In addition to sharing in the mortality risk, a reinsurer can, through coinsurance, also assume responsibility for investment, lapse, and a portion of the expenses on business it reinsures. Through this method, the reinsurer can provide a specific service other than risk protection by relieving the ceding company of any surplus drain associated with new business on the portion reinsured. This can be of considerable assistance to a company that is expanding its market facilities, introducing new products, or taking some other action that might result in a significant new business drain on surplus. A company might utilize coinsurance for all or part of its new reinsurance, or it might even coinsure an existing block of business to free surplus funds for further development.

The areas of assistance discussed thus far are those most of you probably would expect the reinsurer to grant, since these areas are related in some degree to its own financial involvement. Perhaps the least-known and, as a result, often the most-misunderstood services of a professional reinsurer fall in the area of assisting clients with operational problems that arise in the day-to-day management of a life insurance company. These services are generally in the nature of providing information on practices and procedures or serving as a sounding board for ideas. While most of the requests for assistance in this area come from newer or smaller companies, it is not limited to these.

The reinsurer also receives requests for information from older estab-

lished companies and people exploring the idea of starting a life insurance company. One of the first pieces of advice that we would give a group exploring the pros and cons of starting a life insurance company would be for them to retain the services of a consulting actuary if one had not already been retained. The same advice would be given an established company without an actuary that was seeking assistance in an area calling for actuarial guidance. While the professional reinsurer can supplement the services of a consulting actuary, it cannot and should not try to supplant these services. To my knowledge, the professional reinsurers are very careful to recognize this distinction and avoid putting themselves in what could be a very difficult position of trying to serve two masters.

All reinsurers welcome visits by their clients to discuss various problems with appropriate members of the reinsurance companies' home office staffs. As you probably know, some reinsurers have a substantial number of people constantly traveling and visiting prospective and existing clients. Many of these individuals have broad backgrounds or training in specific areas enabling them to provide helpful information to clients. Some reinsurers hold seminars as a means of disseminating information on specific topics.

By virtue of experience in their own operations and broad exposure to the insurance industry as a whole, professional reinsurers do accumulate a fund of knowledge on most matters affecting the operation of an insurance company and about what is going on in the industry. As a result, they are frequently called upon by their clients and consulting actuaries seeking information on a wide range of subjects. The requests may range from such simple things as obtaining a copy of an application form to discussing the installation of an electronic data-processing system, establishment of a salary-administration program, development or revision of an agency organization, pros and cons of entering a new line such as accident and health, or any number of other areas of information.

Reinsurers may even be asked to review a company's plans for future development in conjunction with its actuary, particularly as they relate to adequacy of surplus funds. In an area such as this, the reinsurer can assist only to the extent that it can review the results that would be developed under a given set of assumptions, which must be established by the company's actuary and management. The reinsurer is not in a position to know all the intimate details of a company's operations or objectives that would be necessary to the intelligent development of a plan for a company, nor should it be. That is strictly the responsibility of the company's management, and the reinsurer's role must be limited to one of discussion with the company's management and actuary to give them the benefit of its experience.

Reinsurers are often told of positions their clients have available and are frequently contacted by individuals interested in changing positions. As a result, they serve in a limited capacity as a placement bureau. An interesting sidelight to this function is that the reinsurer's staff is often a prime target, with the result that the reinsurer may end up with a vacant position. Perhaps this is carrying client service too far.

Making their own experience and know-how available as a sounding board to its client companies is one of the most valuable services that the reinsurer performs. Through this, many companies are able to have their own ideas clarified and are assisted in developing an operational plan along sound lines. It should be recognized, however, that, while the reinsurer can offer advice and guidance to a company in its day-to-day operations, the full responsibility for deciding the course of action to follow obviously rests with the client company.

The relationship between the professional reinsurer and his client may be viewed to some degree as a partnership arrangement. The reinsurer is anxious to help its client companies grow and prosper in a manner that is in the best interests of the industry and public. The general maxim that if the client company succeeds then the reinsurer succeeds has a lot of truth in it. It is also true that, to the extent the reinsurers help their clients grow and develop along sound lines, they also help strengthen the insurance industry. The facilities and services provided by the professional life reinsurers have played a very important part in the growth of the life insurance industry in this country and will continue to do so in the future.

LALANDER S. NORMAN:

The cost of reinsurance can have many different meanings. It might refer to the gross premium rates for reinsurance, or it might refer to such premiums less refunds or dividends under present-day participating reinsurance practices. It might also refer to such premium outgo less the inflow of claim payments received.

The "out of pocket cost" concept, as defined in Charles A. Ormsby's 1952 paper (*TSA*, IV, 448), is a useful concept for the purpose of profit measurement and issue-limit problems.

In Mel Stein's excellent paper presented at this meeting, the cost of reinsurance is dealt with from the standpoint of the effect on the gross premium required by the issuing company assuming a specified reinsurance arrangement is in effect.

If the cost of reinsurance should be described as the excess of reinsurance premium payments over the value of all the payments received and the services and benefits derived from a reinsurance arrangement, the

members of the panel would undoubtedly insist that this cost is negative in any reasonable reinsurance arrangement. Perhaps most of you present will agree with such a statement. At least you will agree that such is a desirable objective.

It is not our purpose here to fix on any one concept of cost but only to recognize that there are several. Definitions of various cost concepts are adequately set out in Ormsby's paper, in the Society's study notes for Part 10, as prepared by John Wooddy, and in Mel Stein's current paper.

The cost of reinsurance, whatever the concept, will obviously be affected by reinsurance premium rates—the level of the rate, the refund formulas where used, and the methods used in applying them. The premiums must amortize high initial expenses, and the mortality rates themselves must be expected to be higher for reinsured lives because of the greater frequency of problem risks.

To me, conventional life reinsurance means annual renewable term (or yearly renewable term or risk premium reinsurance) based on the net amount at risk on the reinsured portion of a policy. However, coinsurance and modified coinsurance have also been sufficiently widely used that they ought to be included as methods of conventional reinsurance.

The coinsurance or modified coinsurance arrangements and annual renewable term reinsurance arrangements differ mainly in the incidence of the cost. The tendency has been to use one of the coinsurance forms where there is emphasis on the need for greater immediate relief from surplus strain associated with the writing of new business. However, it costs something for the reinsurer to furnish such relief in addition to the transfer of risk, and generally it will be found that the annual renewable term reinsurance will be somewhat less costly than the coinsurance forms in the long run. Coinsurance is also used for disability benefits and to some extent for health policies.

Perhaps the most remarkable thing about the cost of life reinsurance is the magnitude of the reduction that has taken place over the last forty years or so. There have been successive reductions in annual renewable term reinsurance premium rates. Mr. McAulay has pointed out, in his recent discussion before the Conference of Actuaries in Public Practice that the nonrefund premiums to reinsure a life policy in 1950 compared with those to reinsure the same policy in 1965, with original issue age 40, have decreased 58 per cent in the first five policy years, 50 per cent in the first ten, and 44 per cent in the first twenty. These percentages exclude the 1965 policy fee. For a $25,000 policy reinsured, the policy fee would change the percentages over twenty years by 5 points. For a $250,000

policy reinsured, the change would be negligible. He derived these figures from the published rates of one of the outstanding reinsurers. Of course, you know that the reinsurance business is very competitive, and similar changes will be found to have taken place throughout the business.

As I run through our own old rate schedules, I find, for example, a renewable premium rate for standard life insurance at age 30 of $8.55 per $1,000 that was in use back in the 1920's. Later in the 1920's, this rate at age 30 was $7.77. In 1929 it went to $6.37. Later in 1929 it went up somewhat to $6.76. By 1945 it was down to $5.06. In 1950 there was a further reduction to $4.58, but these were now designated as participating rates. The nonparticipating or nonrefund rate was $3.58 in 1950. By 1955 the full refund rate had gone to $3.46. Nonrefund rates went to $3.02 in 1958 and then to $2.87 in 1962. The first-year rate was usually half the renewal rate. In recent years the reinsurers have also reduced the expense charges in refund formulas.

During this same period comparable reductions were being made in substandard reinsurance premiums, and the reinsurance companies were among the first to reflect the lower female mortality in their premium rates. We did this first by an age set-back, originally three years and later four years, and we now have separate schedules for males and females.

All these cost reductions and the magnitude of them might lead one to think that the rates had simply been much too high in the beginning. As it turned out, in some instances perhaps they were. But we must look at this in proper perspective. Considering the beating that the reinsurers took on large policies in the early 1930's, and the general uneasiness throughout the industry regarding large amounts of insurance in those days, I do not believe that there was any general feeling that the reinsurers were overcharging. As experience improved, partly with the help of improving underwriting techniques and also with the marked improvement in population mortality experience, the reinsurance costs were reduced.

Other factors accounting for the reduction were the increasing knowledge and, hence, increasing confidence on the part of the reinsurers, with a consequent willingness to get along with less premium for the "business risk" aspect. Mechanization and the increasing use of EDP equipment have also helped reduce the cost of reinsurance. Part of the benefit to the issuing company shows up in the form of a reduction in the amount of clerical work required in its office.

By 1964 the level of annual renewable term reinsurance premiums had reached the point where margins were thin enough that it seemed logical to take steps to improve the fit between the premiums charged and the incidence of costs, both claim costs and expenses. This led to the general

adoption of select and ultimate premium-rate patterns and the use of policy fees as well as some recognition of the difference in mortality costs on nonmedical as compared with medically examined business. The patterns of reinsurance rates by age and duration offered by the various reinsurers now differ much more widely than formerly with respect to the incidence of the costs. The general effect is a further reduction in the costs.

I am not going to attempt to describe any one of these new rate schedules in detail, since we are committed here to avoiding any partiality, and we do not have time to describe them all. However, I should say that there is an excellent summarization of the nature of the changes in the August, 1965, bulletin issued by Bowles and Tillinghast.

Before closing I would like to say that it does cost something to reinsure and that the examination of these costs is certainly a proper province of the actuary. We believe the cost to be small enough that it need not be a constant source of concern but rather represents the cost paid for stability and faster growth, releasing the energies of the actuary and others in the company in favor of other areas of endeavor that can be of major benefit to policyholders and stockholders.

Whatever cost the actuary finds should, of course, be weighed against the values to be received and against the alternative of having to accumulate surplus or sell stock to provide the larger amount of capital that would be needed to support the issuing company's operation in the absence of reasonable reinsurance arrangements. One should also consider the fact that the reduction of risks, particularly those relating to chance fluctuations and to uncertainty of classification, by passing them on to the reinsurer tends to reduce the rate of return on capital that is needed to compensate properly for the business risk involved in the company's operation.

ARCHIBALD H. MCAULAY:

The literature on the subject of reinsurance pools is very meager. Apparently the only reference in the *Transactions* is a summary of Mr. Cannon's remarks in 1950. Outside the *Transactions* there appear to be only two papers. One is an excellent paper on the operation of a reinsurance pool submitted to the LOMA in 1949 by Miss Hopgood (Mrs. A. N. Kerwin). The other is a paper by Professor Howard in the *Journal of Finance* of 1956. Considering the keen interest shown by many actuaries in off-the-record discussions of reinsurance pools, the subject would appear to merit a critical review in the *Transactions*.

As Howard points out, there were a considerable number of reinsurance agreements between American companies as early as the nineteenth cen-

tury. However, if one company received poor business under such an agreement, all it could do by way of retaliation was to submit poor business in return to the other company. This procedure is self-defeating, and it is no surprise that, with the rise of reinsurance companies in the early part of the twentieth century, these reinsurance agreements largely disappeared. The reinsurance companies were prepared to evaluate a risk, stand the chance of loss, and not ask the direct company to take back any business.

Reinsurance pools, as we know them, arose in the twenties, and at the present time there are about half a dozen reinsurance pools in the United States. It should be stated at the outset that the "pool" does not actually exist as a separate entity. What we are discussing here are simply organized rules for exchanging payments among members of a group of companies upon the occurrence of certain contingencies. While there are differences in the operations of these pools, I believe that the theory generally accepted is that each member company of a pool is responsible for its own mortality. One of the larger pools lists as its objective "to permit each company to bear the total effect of its own underwriting of a life." The actuary of another pool states that "a company experiencing heavy claims repays its deficit in the long run."

Certain advantages flow from this theory. A member company does not need to depend on retaliation to make up for poor business it accepted from another member company. There is no necessity to underwrite or value the cases submitted by the member companies to the pool. Also, the members of the pool can act independently and compete vigorously with one another in their normal operations.

On the other hand, if this theory is accepted, the question arises whether we are dealing with reinsurance or a form of self-insurance with a built-in spread-loss provision in the event ot heavy claims. With the various modifications of the pool concept which are being considered at the present time, this question and the consequences which flow from it are being given, I believe, greater consideration than before.

There are great variations in pools, and it might be instructive to look at the operations of a couple of them. In one large pool the same agreement is signed by all members. In this pool no insurance records whatsoever are maintained by the accepting companies until death occurs. At that time the pool members pay their respective shares in accordance with the rules of the pool. The company suffering the claim is charged with 15 per cent of the claim for the next ten years. The premium is increased when the member company has not received a dividend for five consecutive years. The 150 per cent of the average claims over a ten-

year period makes allowance for interest and for a possible increase in claims in future years. Any excess charges are returned by a refund formula based on the individual company's experience as a *ceding* company.

The above practices would seem to be in line with the objective of this pool, namely, to permit each company to bear the full effect of its own underwriting of the life. Also, these practices would seem to suggest that the company suffering the claim is paying for the dead policyholder in the ten years following the death.

In another pool each member company signs two separate documents with each other member of the pool, for business ceded in each direction. In other words, there are only two parties to each contract. The premiums actually charged are well in excess of what would be charged by a commercial reinsurer on a nonrefund basis. Assuming ordinary life risk amounts subject to Linton B lapse rates with initial cession size of $25,000, the premiums for the first five, ten, and twenty years are 143, 127, and 120 per cent of the commercial rates at issue age 40, and 138, 125, and 124 per cent at issue age 50. If the claims are light, the excess premiums are returned by refund formula. If the claims become heavy, the high premiums become an effective charge to the company.

If we can assume that the commercial premium is ample to pay the higher expenses of the commercial reinsurer and at the same time provide a profit for him from mortality, then the still higher premiums of the pool should be ample to make sure that each member of the pool eventually pays for its own claims. If the company is running a deficit to the pool as a result of heavy death claims, this deficit will also be liquidated in future years by the member company.

It is interesting to look at the underwriting situation of one of the smaller members of a pool, say, a member with a retention for its own account of $50,000 and a pool retention of half a million dollars. When the underwriter of this company accepts a case for half a million, retains $50,000 and puts $450,000 in the pool, he may not fully realize that he is actually binding his own company for the entire $500,000. The only advantage he or his company may get from the pool is that a $450,000 claim will be spread over, say, the next ten years. Also, the underwriter of this smaller company underwrites the half-million-dollar risk with little or no help from the other members of the pool. Further, he does not have the advantage of an independent evaluation of the risk by an outside reinsurer, and, in particular, he has not had the careful scrutiny of his entire portfolio by a reinsurer. The type of underwriting and medical department required to handle a risk of half a million dollars is totally

different from that required to handle ten risks of $50,000 each. I believe that a higher-grade and more-expensive staff is required.

Incidentally, if the small company was having a good year, it might be cheaper if it could pay the $450,000 without referring the matter to the pool and get an immediate saving in income tax.

Even if there is no profit in mortality to any member of the pool, it is still possible for a pool member to make a profit from the expense factor in the refund formula. I believe that it is generally recognized that the expense charge retained by the companies accepting the business is appreciably greater than the actual expenses, and, as such, the company getting more business than it gives off stands to gain.

I think it might be stated as a general rule that if you are joining a reinsurance pool you should try for one in which you would have the largest retention and get more business than you give off. Also, you should make sure that you have an excellent underwriting and medical department which can underwrite to the pool's retention and not merely to your published retention. Also, you should make sure that you can stand the strain of paying your charges to the pool after the claim occurs.

It is interesting to speculate on what would happen to a pool if we should ever have a depression anything like that which started at the end of the twenties. The present inflationary period shows some resemblance to the expansive atmosphere of the early twenties. There is the same drive to get business, business at almost any cost. There is the same drive to get large policies issued and the same pressure for sloppy underwriting on large cases. The large policies of the twenties produced extremely high mortality in the early thirties, and the reinsurers suffered heavy losses. Since the members of a pool are acting as reinsurers for one another over the short term, I would expect the mortality of all pool members to be heavy in a depression. There is little point in having a risk-exchanging device if all the members are subject to the same hazard at the same time.

I would assume that a desirable characteristic of a reinsurance pool is a geographical spread of the companies so as to reduce as far as possible the occasions when the agents of two member companies are competing for the same piece of business. There is no necessary relationship in the liberality of the underwriting of two member companies. One member company may rate, and hence lose the case for its own full-time agent, and yet apparently reinsure on the standard basis the same case for his competitor. It must be difficult to explain this situation to the agent who lost the commission. If the various members of the pool have the same broker, the broker, by simultaneous submissions, can play one member of the pool against the other. The worst situation would be a pool in, say,

New York City, where the members of the pool are depending on the same brokers for an appreciable volume of their business. In such an extreme case the underwriting and mortality of the pool companies would probably follow the underwriting and mortality of the most liberal member of the pool. It should be noted that up to the pool limit the independent underwriting judgment of an outside reinsurer does not usually come into play.

I believe that a reinsurance pool for large risks is required for our business, but it would seem to me that the pool should be run on insurance principles and not on self-insurance principles. In other words, true pooling of risks should be practised, and the theory that each member will pay for its own mortality should be discarded. Instead, each risk put into the pool would be underwritten by the pool. Although there may be dozens of companies submitting business to the pool, the standards of underwriting should be as uniform as possible and set by the custodian of the pool. Once in, the risk would share the fortunes of every other risk in the pool. The pool might be on a refund basis, but the refund would be there for the protection of the pool as a whole and not to make sure that each member pays its own claim. For example, each member of the pool would get the same proportionate refund irrespective of whether it contributed some or none of the claims to the pool. More importantly, one company should stand behind the pool with all its resources and all its experience on pooling risks, so that in an emergency the ceding insurers will be protected.

JOHN PHELPS:

The fourth topic is a rather lengthy-sounding one, but I shall try not to speak at such length regarding it—nonproportional life reinsurance techniques and comparison with reinsurance practices in nonlife lines, including health and accident benefits.

Five, and even ten, years ago, there began to develop an increasing interest in the possibility of applying nonproportional reinsurance techniques to life insurance portfolios. Some of the developments giving rise to this interest were as follows:

1. The greater intermingling of life and nonlife operations exposed more life insurance people to the nonproportional reinsurance techniques already widely used in the nonlife field.
2. The rapid growth of group insurance led to more study of collective risk theory, which is not only useful in refinements of group insurance pricing but also forms the basis for most nonproportional reinsurance methods.
3. A large well-known British institution found nonproportional reinsurance to be a feasible way of entering the life insurance field, whereas its unique organi-

zational pattern had made it difficult to offer the long-term noncancellable coverage provided by individual life insurance or reinsurance contracts.

4. Reinsurance brokers, who had played a minor role in the life field, began to find nonproportional coverage a ready door-opener into certain life company offices, particularly where management tended to be on the conservative side.
5. Actuarial consultants to small and medium-sized life companies found the concept of nonproportional reinsurance sufficiently interesting from a theoretical viewpoint to warrant further investigation.
6. Internationalization of actuarial science increased, and communication became more common between the North American and European actuaries, thereby exposing the former more thoroughly to the excellent work done by the European mathematicians in advanced risk theory and statistical techniques.
7. The widespread use of profit-sharing by life reinsurers has brought to light some of the mathematical similarities between such arrangements and certain forms of nonproportional reinsurance.
8. Finally the increased concentration of risk in the modern world has focused attention on such hazards as catastrophes and especially things against which conventional life reinsurance may not provide complete protection.

Despite the fact that at least three forms of nonproportional life reinsurance have been more or less readily available for the last two or three years, the actual amount of such coverage has been relatively small compared with the amount of discussion about it. One is somehow reminded of the apocryphal story of a large manufacturer of dog food who spent millions of dollars promoting a new brand and then millions more for research to determine why it did not sell. After a great deal of inquiry, the reason was found to be that the dogs just did not like it. The moral of this story might be applicable to catastrophe and stop-loss and spread-loss reinsurance.

Catastrophe insurance for a life company is very similar to the comparable coverage for either property or casualty lines. A typical arrangement might provide for payment of a fixed amount, such as 90 per cent of the aggregate losses, net of conventional reinsurance, if any, in excess of a predetermined limit—such as one million dollars—suffered by the ceding company as the result of a single accident or disaster such as an airplane crash, conflagration or hurricane. A maximum limit is also set on the reinsurers' liability, and the contract is usually for a period of one year or, at most, two or three years in some few instances.

It is true, I believe, that at least three or four large life insurance companies in the eastern part of the United Stated actually have purchased and have in force coverage of this type—catastrophe coverage. I under-

stand that there was a paper a few years ago by one of the actuarial officers of the first such company to buy this type of coverage, and I think it would be appropriate to mention that his name is Ed Green and that you can find his paper in *Transactions*, VI, 506.

The advantages of such an arrangement might be quickly listed—at least those that I have heard mentioned: It is easily understood, even by a nontechnician and covers an obvious if highly improbable hazard. It is very flexible, because it can be applied either to an entire portfolio or only to the group line or ordinary, industrial, accidental death benefits—any line or combination of lines. Its cost appears to be quite small, at least in relationship to the potential recovery from the reinsurer. The information required by the reinsurer for a quotation is not minor in quantity or detail, but it is not nearly so detailed as it is for some of the broader forms of nonproportional reinsurance. Finally, it is simple to administer.

Some of the points that have been mentioned on the other side of the fence include the fact that catastrophe coverage solves only part of the problem, because any life company—as we know—can suffer bulges in mortality from other causes, such as epidemics, cyclical swings, or just an abnormally high average size of claim or an abnormally large number of claims. It is a limited coverage, even in a catastrophe sense, in that it usually restricts both war and nuclear-energy hazards.

Perhaps most important, it is a short-term, rate-adjustable, casualty-type coverage of necessity, which is perhaps not compatible with the long-term, noncancellable nature of the primary company's liability under its life policies.

The actual cost of a catastrophe cover may look quite small, and yet it is my impression that the premiums charged tend to be several times the pure risk premium, whatever it may be. I think that this is quite natural when there are such a small pure risk premium and such a very large potential loss.

It might be considered also in today's profit-squeeze economy that such coverage is an additional expense, to cover a risk that perhaps a company could afford to carry itself, assuming it has adequate surplus funds, merely as part of being in the life insurance business.

Of course, catastrophe cover is not new. It has been around for years. I think there has been more of it bought by American life companies in the last five years than probably in the previous fifty. Perhaps some of the people here may wish to comment if their own companies have such coverage.

The second type of nonproportional reinsurance, generally speaking,

is stop-loss, which is quite similar to a catastrophe cover except that it does not confine itself to accidental or act-of-God types of events. Whatever the cause of abnormally high mortality might be, a stop-loss arrangement purports to cover it. Again, it would be perhaps 90 per cent of the excess over some expected mortality level, and defined in the treaty up to some limit, such as $5 million.

It has been given various other names, such as "excess of loss (abnormal mortality)," "excess of loss ratio," and "aggregate excess of loss." I find the short phrase "stop-loss" to be fairly descriptive and handy.

Again, as in the case of catastrophe, a stop-loss treaty, from the viewpoint of the reinsurer, necessarily has to have certain restrictions and limitations. As in the case of catastrophe reinsurance, sometimes these reduce the merit of the coverage below the theoretically desirable perfect level.

The advantage can, again, be listed, that it covers much more directly and effectively the thing that a life company really should worry about, namely, paying too many dollars or francs or deutschmarks—paying too much out in claims above the expected level, whatever the cause might be.

A carefully drafted stop-loss program could, conceivably, enable a ceding company or an issuing company to increase its normal retention limit substantially and thereby, perhaps, by decreasing its volume of conventional reinsurance, result over-all in a net reduction of the total outlay for reinsurance.

Third, by the same token, a reduction in the amount of paper work on individual policy reinsurance records could conceivably lower the total administrative expenses.

In practice, I think that both the prospective purchasers and the reinsurers who offer this type of coverage have encountered certain disadvantages or practical problems. In the first place, as in the case of catastrophe coverage, stop-loss does not parallel the conditions of the primary insurance involved. It almost has to be nonguaranteed renewable and certainly not with a guaranteed premium rate over an extended period of years. It is possible to think of a circumstance in which a life company with such coverage could encounter a terrifically high mortality for some reason which would continue beyond the end of the contract period for the stop-loss, be terminated by the reinsurer, and not be able to get such coverage or even conventional, individual policy coverage during the next two or three years, when the mortality continues to be high. That could be an uncomfortable position.

The exclusion or the severe restriction of the war hazard is another drawback to the potential purchaser of such coverage. It does not con-

stitute a real defect in the mechanism, but the maximum limit which the reinsurer must place upon his liability could be inadequate to really solve the problem. A really large life company with the need for a very high limit might have trouble finding the capacity today that is required to cover a $25 million maximum liability on a stop-loss cover.

Some managers of life companies have expressed concern about the warranties or other restrictions placed upon any changes in the ceding company's underwriting rules of procedure. I think that even the reinsured companies agree with the reinsurers that these are essential. Even though they can see why this must be, there can be a subconscious psychological erosion of underwriting standards if the company has a stop-loss cover. It would be natural to adopt the attitude, "Even if we do loosen up our underwriting a little bit, we are protected." I gather that this may have happened in at least one or two instances already.

There is some question about the amount of expense reduction that can actually be achieved as compared with conventional single-policy reinsurance. I have already mentioned the rather substantial loading factor that must be included in such reinsurance premiums.

I think that it is almost always necessary to continue some conventional life reinsurance, because you cannot disturb a stop-loss arrangement by having one or two $5 million policies in a portfolio of average-sized $10,000 or $15,000 policies—it just does not work—so you cannot usually eliminate individual policy reinsurance record-keeping entirely. Also, the record-keeping expense does tend to be rather small, by any measure, on individual policy reinsurance.

The stop-loss arrangement tends to require more man-hours of time at the higher salary levels, whereas conventional life reinsurance can be handled either on machines or by lower-paid clerical personnel.

There are perhaps some other factors we have mentioned—for example, the services provided by life reinsurers. They do cost money, and the loading is included in the conventional life reinsurance premium rates. If the services—as we hope—are valuable or even essential, then those services would have to be provided somehow, either by the reinsurers with appropriate loadings in the nonproportional reinsurance premiums or from other sources for appropriate price, so that again, perhaps, the reduction in reinsurance cost may not be as substantial as had been originally anticipated.

The spread-loss type of arrangement is a completely different breed of cat, and I think that it has already been described in part by Mr. McAulay. It really is an arrangement whereby, instead of through a pool, through a single reinsurance company the ceding company may spread

any bulge in mortality over a period of three, five, or ten years—always winding up by not only paying its own claims but also an expense and profit charge to the reinsurer for its pains.

There is a question in some minds about the annual statement effect of such arrangements. This is a very delicate question, and I just thought I would mention that such a question does exist.

I might mention that in the field of health insurance there are at least five methods of offering reinsurance coverage. One is risk premium, similar to what some call yearly or annual renewable term. I think that the best example is an accidental-death benefit like double indemnity on a life policy, where a typical reinsurance premium rate would be, say, 25 cents per thousand the first year and 90 cents per thousand in each renewable year; that would be, at least in this example, with coverage terminating at age 70 on a double indemnity benefit attached to a concurrently issued life policy. Higher rates normally apply to straight accident policies, and, of course, there are substandard rates going up the line.

Then, in connection, for example, with the automobile accident benefit, a typical additional premium would be 40 cents per thousand per year, flat, if the benefit is a secondary one attached to a life policy, with higher rates applying if it is in an accident policy by itself.

The second method is coinsurance, again quite parallel to life coverage, where the reinsurer receives the same premium from the issuing company as it receives from the insured, less commissions and/or expense allowances which cover the commission outlay of the issuing company and at least part of its other expenses.

The third type is a rather interesting one called—at least by one company—the extended-wait approach to reinsuring, typically, disability loss-of-time benefits. The way this works is that if the benefit itself in the original policy is a three-month wait (that is, the insured must be continuously disabled for three months before he can start collecting benefits), then perhaps the reinsurer might say, "Fine, you can pick up the tab for the whole $300 a month from that point and for the next two years, because that total amount is within your capacity to withstand; but if the insured is still disabled and still collecting, we will pick up the tab for 90 per cent from that point on, or perhaps in some cases 100 per cent."

This type of arrangement can be combined with coinsurance of excess amounts from the first dollar of benefit in various ways to achieve whatever purpose and whatever protection the ceding company may desire. It is a rather flexible type of arrangement. Again, just an example for a lifetime, nonconfining accident benefit of a hundred dollars a month, the

extended-wait reinsurance premium charged by one company on a one-year wait would be $2.50 per hundred dollars a month on Classes AAA and AA and then would grade down—for example, a three-year wait would be $2.10 as compared to the $2.50 for one year and a five-year extended wait $1.70 per $100 a month.

The many combinations of waiting periods and rating classifications can be a very complex-appearing schedule, and yet, as applied to a particular company's portfolio, it can be a reasonably simple arrangement.

Another form of reinsuring health benefits is a so-called excess loss. This is sometimes applied, for example, to major medical benefits, where perhaps the original company may pay all the claim up to $2,500, but, when the amount of benefits goes over that, the insurer will pick up the tab for the excess.

Finally, catastrophe coverage, which I have already mentioned, can be applied to the accidental death benefit portfolio, perhaps in combination with one or more of the others, such as risk premium or coinsurance. The main point to be made is that there are many practical devices for solving any reinsurance problems that may arise in the health and/or accident field.

I am not sure that this properly belongs in this set of comments, but I might mention that for such benefits as the insurability rider—called by various names—reinsurance is available and has been bought in various ways, including single premium or coinsurance. There are also schedules of group conversion reinsurance premiums. In other words, if a group contract on an individual is converted to a permanent plan, we all know that in the aggregate we get excess mortality, and there are single premiums which may be paid at the time the conversion is made with regular standard reinsurance premiums payable thereafter. So, there is one single extra at issue on top of the regular standard reinsurance premium.

IAN G. MICHIE:

I propose to touch very briefly upon the points a North American company should consider when placing business with a foreign reinsurer and those that should be borne in mind by a North American company that is considering soliciting reinsurance in the international market.

We know that there are an increasing number of foreign reinsurers seeking business in North America. At present, I believe these are limited to European companies, but there is no indication that this will always be so. A few United States companies are also seeking business in Europe or are considering doing so.

I should perhaps start by briefly summarizing the American scene and

from there note the differences as compared with the European market. Reinsurance here is written either by professional reinsurers or by direct-writing offices which make a specialty of seeking reinsurance, or it is arranged on a reciprocal basis between individual companies or groups of companies. It is arranged on a YRT, coinsurance or modified coinsurance basis, par or nonpar, and in the United States there is normally a recapture provision in YRT agreements.

In referring to conditions overseas, my remarks will mainly center on Europe—the oldest insurance market and hence the oldest reinsurance market. Germany is the home of the oldest professional reinsurance company in the world, and the largest company is in Switzerland. The European market reveals many differences from North America.

The professional reinsurer is frequently found in association with direct-writing offices—sometimes by owning them, which is very common in Germany and Italy. In some countries, notably in Scandinavia, groups of otherwise independent life offices work through one reinsurance company: sometimes this "pooling" is confined only to substandard business. There are very old established companies in Holland and Denmark which write little else besides substandard risks.

In some cases, notably the newly developing countries, reinsurance has been nationalized in whole or in part. Brazil, Argentina, Chile, Ceylon, and Egypt are well-known examples. Basic methods of reinsurance are similar—YRT, coinsurance, and modified coinsurance, but YRT does not always have the pre-eminent position it seems to enjoy here. Moreover, some of the details of the methods employed are substantially different. I will touch on this later.

What of the problems of placing business with a foreign reinsurer or of transacting reinsurance abroad? One point common to both, which must never be overlooked, is the value of knowledge of the ethnic origins and characteristics of the country with which you will be dealing. These national characteristics play an important part in negotiations and tend to color the interpretation of even the basic concepts of business, such as utmost good faith. There is the story of the newly appointed manager of a branch east of Suez who was shown around on his arrival by the indigenous chief clerk. After the inspection, the new manager said, "That all looks fine, but what was that pile of policy copies doing on top of the cabinet in the corner?" "Oh, sir," came the answer, "those are our recently issued policies. We wait to see if there is a fire, so that we know whether to reinsure!"

The American insurer should satisfy himself that the foreign reinsurer

is aware of local policy conditions, particularly those regarding suicide and incontestability. These are universal here, but by no means so overseas. It may not be the insurer's duty to insure that the foreign reinsurer knows the facts of life, but it is in his own interest to see that as many sources of contention as possible between insurer and reinsurer are removed. The North American practice of giving binding receipts before the policy is issued would be quite unfamiliar in many countries, and, since the binding receipt may frequently affect the liability of the reinsurer, this too is a point of some importance. Other less important differences in practice which occur to me concern nonforfeiture systems and the payment of interest on death claim monies.

Confidential medical information poses a special problem. Because it is confidential, we are not entitled to share it. The foreign reinsurer, offered a highly substandard risk for his own classification and without the protection of confidential information, may arrive at a totally different underwriting decision from that of the local reinsurer. This can cause problems with your own agency force, who may find it difficult to understand and accept two or even three different standards of underwriting—your own, your American and your foreign reinsurers'. I can offer no solution to this problem.

There are at least two other sources of difficulty in the underwriting field. British reinsurers frequently quote debts or liens, and sometimes for very highly substandard risks will only quote a lien. Secondly, their underwriting standards may be different from yours, not merely because of the problem of the lack of information but also because of the different underwriting practices and outlooks on impairments, which, unless you have very close and regular contact with your market, will tend to influence the underwriting. Obvious examples are the British attitude to chest complaints; pneumonia, influenza, bronchitis, and asthma are much more prevalent in the United Kingdom than they are in North America because of climate and are regularly rated sometimes heavily. On the other hand, no rating is applicable there for living with another man's wife or drinking regularly every night at the pub (unless this is revealed to the medical examiner by a very alcoholic countenance), because there is no system of inspection reports. There may, however, be a much more fundamental reason for a difference in underwriting standards.

In the United Kingdom, and probably in many of the Continental European countries, underwriters deliberately do not try to be so precise as their North American counterparts. Their philosophy is to have as broad a standard category as possible while maintaining reasonable equity between groups of policyholders. Perhaps this philosophy is en-

couraged in some countries by the use of population mortality tables for the calculation of life assurance premiums, but the fact nevertheless remains that there is generally a much broader approach to underwriting than there is in North America.

However, when the foreign reinsurer comes to North America and finds himself the recipient only of what the North American insurers and reinsurers would classify as substandard risks—by their underwriting standards and on their mortality tables—then the European reinsurers' attitude will change. He obviously cannot afford to maintain the broad outlook.

Be prepared, therefore, in dealing with European reinsurers not only for different attitudes to underwriting but perhaps also for changing attitudes.

A North American insurer, about to enter into business relationships with a foreign reinsurer, will naturally be concerned about the ability of his reinsurer to provide local currency for the settlement of claims. North American government regulations regarding deposits and licenses will, of course, ease your concern. Normally, however, the established foreign reinsurer will have no difficulty in obtaining currency to pay his overseas claims. He is very cognizant of his overseas responsibilities and very jealous of his reputation. The overseas operations of international reinsurers form a not unsubstantial part of several European countries' balance of payments, and the governments of those countries recognize the harm that could be done to their trading positions if their insurance and reinsurance companies failed to meet their claim liabilities through lack of currency.

One small point: If your foreign reinsurer is not licensed and does not keep funds locally, clarify with him the domicile of the reinsurance arrangement. What law will govern it? This may not only affect claims disputes, it may very well affect the taxation liability.

Taxation is a subject in itself. Life companies in the United States perhaps have more taxation complexities to face than in any other country, but there are many different systems of life insurance taxation in operation, and there should be a clear understanding between insurer and reinsurer as to who pays what. For example, in some countries taxation is based on gross premiums; in others it is based on profits; in some cases there will be a combination of both; in some jurisdictions there will be a stamp duty, involving a fixed payment per reinsurance cession to the government; and in yet other jurisdictions there will be a difference of treatment between foreign reinsurance and domestic reinsurance.

I have given a long discourse on the problems to be faced in dealing

with a foreign reinsurer. I do not want to put you off—most of these points are easily resolved—but you should be aware of the need to resolve them.

If you are contemplating being a foreign reinsurer yourself and seeking business overseas, you face many of these problems in reverse and a few more. Get to know the characteristics of the country you want to do business in; familiarize yourself with its insurance and reinsurance law and its taxation; find out whether you will be able to remit profits home. Sometimes the opening of a local bank account will result in your becoming liable to exchange control with a resulting freezing of your profits, whereas, if you operated without such an account, paying claims and receiving premiums in United States dollar drafts, you might be exempt from the local exchange control laws. Determine the licensing and investment laws and whether you will be required compulsorily to retrocede a quota of your business to local companies.

I have referred earlier to the YRT method of reinsurance not being so pre-eminent in some European countries as it is here. When you do meet with the YRT system, I think that you will tend to find that rates are basically lower (having regard to mortality and to underwriting practices) than they are here. Companies are interested in low guaranteed reinsurance costs. Recapture on YRT reinsurances is rare. Profit refunds are either nonexistent or very modest; the reinsurer gets a fixed rate for his risk and is assured of it throughout the lifetime of the basic contract, but his rates reflect this.

However, there is perhaps more coinsurance than YRT reinsurance, and the prospective reinsurer will therefore have to study very closely the local insurance and taxation law, actuarial practices, and policy conditions. You will find some very surprising differences from those you are accustomed to here. In few Continental European countries are there tables of mortality of assured lives. Premium rates are frequently based on population tables and may sometimes, therefore, be high in relation to the risk borne. Substantial surpluses have been accumulated by companies, and, although policyholders may have no contractual right to a share of surplus, in practice they do enjoy a share of the distribution of surplus. Methods of surplus distribution are different—the cash dividend system is virtually unused in Britain, except for the Canadian offices operating there, and other methods are used on the Continent. In the United Kingdom, there is no legislation restricting investment in common stock; life offices have substantial proportions of their portfolios invested in this manner and have made very substantial profits thereon. The method of distribution to policyholders of these capital investment

profits has caused British actuaries much thought and resulted in special compound bonuses. The coinsurance of these par contracts is a difficult problem for the reinsurer. In several European countries, minimum (which rapidly become standard) premium rates are laid down by the government, and, as a means of introducing competition and of disposing of surplus, the companies will frequently offer ancillary benefits, such as accidental death or disability coverage, at or below cost. I think that you will readily understand that practices such as these also pose some rather nice problems for the reinsurer!

Speaking again of Britain, you will find no separation of par and nonpar business and no governmental regulation of the share of surplus to be distributed to policyholders. You will, however, find a separation of life and annuity business and quite different taxation of these two classes. The former, in essence, is taxed on investment income reduced by management expenses; the annuity fund is taxed on profits. One obvious result of this is that combination whole life and annuity contracts on highly substandard lives are treated differently in Britain in comparison with the system here.

A further rather startling difference is the almost complete absence in the United Kingdom (once again with the exception of the Canadian offices operating there) of guaranteed cash values. A company reserves the right to pay what it sees fit at the time of surrender. This policy provision therefore makes it impractical to relate the amounts at risk under a YRT reinsurance guarantee to the cash values, as is the practice in the Canadian reinsurance market.

Do make yourself familiar with local underwriting practices. An almost sure way to fail in a venture into a foreign, and well-organized life insurance market, is to attempt to impose your own domestic underwriting rules. It may surprise you to know that confidential medical information is simply not available in some countries—Australia and Italy are but two examples with which I am familiar. Inspection reports are very probably nonexistent. What is a ratable blood pressure to you may be taken as standard in Europe. Conversely, what should be rated as overweight in Europe, we with our North American build tables would take as standard. Do not expect to get EKG's and X-rays as routine items of information on large cases. Be prepared, in certain countries, to receive reinsurance offers on 70 or 80 year olds.

Finally, in a lighter vein, be prepared to develop a sound digestion and sound constitution. With an office in Paris, you are only 200 miles away from London and 400 miles from Madrid—this is akin to having your office in Albany and doing business in New York and Montreal—but the

eating and living habits are poles apart. The Englishman likes his heavy meal of roast beef and Yorkshire pudding and beer at midday, the Parisian will dine in the early evening, and the Spaniard takes his main meal at 10:00 to 11:00 P.M. The poor reinsurer who commutes between all three capitals must try to solve the problem of eating three main meals and still avoid a rating for overweight.

JOHN PHELPS:

As promised, we now throw the session open for questions and informal discussion from the floor.

MR. JOHN S. MOYSE: I believe that Mr. Norman made the statement that mortality on reinsurance is higher than regular mortality. In the underwriting session yesterday it was mentioned that large cases generally showed a lower mortality. Are you getting a different class of business on reinsurance?

MR. NORMAN: The period over which the experience is taken can affect the results. We have now been through a long period of very favorable business conditions along with a period of improving medical techniques which tend to benefit first those who can afford them. The results could be different if we include the period of the thirties in the experience. We must grant that some sort of depression can happen again.

MR. PHELPS: Up to some amount limit, when you compare by amount categories, you will find that reinsurance mortality invariably tends to be somewhat higher than that for the same amount category for direct-written business. When you get to the half-a-million-dollar mark and above, you are in much the same spot on reinsurance as you are on direct. In other words, in this large-amount category there is almost always some reinsurance, so that the mortality differential would tend to disappear at these very high amounts.

MR. HENRY J. SOUTHERN, JR.: I would like to mention what I believe to be an important reason for a reinsurance company's mortality being higher than that under directly written business. On directly written business the underwriter has knowledge of the agent, the medical examiner, and so forth, which is one of the most important factors in determining insurability. In unusual cases it would be better all around to pass this knowledge on to the reinsurance underwriter.

MR. DONALD S. GRUBBS: Reinsurance pools exist between companies which have identical ownership. How would these differ from other reinsurance pools?

MR. McAULAY: If the various companies are separate financial entities, I would hope that the reinsurance pool would operate on insurance principles and not on self-insurance principles. As such, the ceding company would pay a premium, and the accepting company would accept the final responsibility for paying the claim. The accepting company would enjoy a profit if a profit existed or would stand the loss if a loss existed. If so, such a reinsurance pool would differ from the pools which I have described in my paper.

MR. PHELPS: You have a comparable situation with a large professional reinsurance company that has affiliates and within the corporate group will do some swapping around. Basically, you have one set of capital and surplus funds supporting the whole endeavor, and it is just a matter of what pocket it is to be put in.

MR. ALBERT JACOB: Are there technical reasons why reinsurers do not adopt some form of experience-rating formula, as is done in group insurance, reflecting the amount of business reinsured instead of the standard 50 or 60 per cent profit-sharing with claims carried forward, and so forth?

MR. DORMAN: Theoretically this can be done. The volume of business is not necessarily indicative, however, of the experience that will be realized. One company with a small volume of business can have very good experience; another company with a very large volume can have very poor experience. The 50/50 sharing seems to have worked out very well in practice.

MR. PHELPS: At least one of the American professional reinsurers started out originally with a more "scientific" type of experience-refund formula with a form of credibility factor. The customers did not like it. It was somewhat complex. Young companies resent being penalized in not getting as good a price as a large company. Every small company expects to succeed and become a very large account in due course.

MR. JOHN W. WOOD: It was mentioned that some of the large cases get extensive service and some of the small cases might not get as much

service as they would normally be expected to. Perhaps you should expect the reverse, that is, the smaller companies' getting more service since they require more. Would there be some merit in reflecting the expenses, such as the group insurance technique does, rather than putting all into the same mold, which is implicit in the 50/50 refund?

MR. PHELPS: I do not think that any of us could deny that this would be more scientific and more elegant. However, in practice, the economics of the reinsurer have simply not permitted it.

MR. McAULAY: Reinsurers, as is quite proper, act independently of one another, and naturally there are some risks on which a reinsurer may make a quotation which appears to be surprisingly low. On the other hand, with the new competitive rates, there is no reinsurer which can afford to consistently underprice his product, and the problem mentioned by the last speaker should be substantially less in the future than it has been in the past. Incidentally, in the companies where the reinsurers have most influence, namely, the smaller companies, I have been surprised at the relatively sound standards of underwriting which have been maintained notwithstanding the extreme pressure for business.

MR. STANLEY W. DALE: I would like to describe the relationship between the small company and the consulting actuary as follows: Visualize three circles strung like three links of a chain. The center circle is the area in which the consulting actuary and the reinsurance companies work together, the circle on the left is the area in which the reinsurance company does its work, and the circle on the right is the area in which the consulting actuary does his work. The responsible consulting actuary and the responsible reinsurer understand this.

MR. ALFRED L. BUCKMAN: When you are dealing with a foreign reinsurer, such as Lloyd's, domestic companies have to be sure that they are covering their bases as far as permanency of the contract is concerned. Years ago we started a new plan of insurance. The domestic reinsurers charged more than Lloyd's. We went with Lloyd's, but after three years, not because of adverse experience but because of inadequacy of production, our contract was cancelled and we were left with some very substantial risks, without reinsurance. We did find domestic coverage, but for a short time we were without coverage. Fortunately, there were no claims in that short period.

MR. J. STANLEY HILL: I would like to pay tribute to Mr. McAulay for his very objective treatment of reinsurance pools.

We are well along in the preparation of an interacting computer model to test the financial efficacy of a stop-loss arrangement. We are extremely aware of the importance of deviation of mortality experience from the standard. In the process of our studies we have come to question two generally held theories about mortality: (1) statistical assumptions can be applied with validity to all years except those embracing wars and epidemics and (2) a Monte Carlo technique can be applied to the same years, since it reproduces the mathematical statistical results.

In the process of trying to determine the validity of our underlying assumption concerning the dispersion of mortality, we have some evidence that (after eliminating war years and epidemic years) our dispersions are about three times what you would expect from the mathematical applications. Such dispersions would have produced rather startling results under stop-loss contracts. This may account for some of the high premiums already mentioned. I am seeking the help of the panel or others concerning actual studies which either appear to support or deny this three times phenomenon.

MR. PHELPS: Some of the reinsurers who have gotten into stop-loss have been finding the same sort of thing. Actual experience somehow does not seem to work out the same way that the formulas say it should.