TRANSACTIONS OF SOCIETY OF ACTUARIES
1952 VOL.4 NO. 10

DISCUSSION OF PRECEDING PAPER

ARCHIBALD H. MCAULAY:

The subject which Mr. Ormsby has brought to our attention has been frequently discussed by Home Office officials and the field forces of various companies but there has been little opportunity for a discussion before a professional body such as this. This is a subject which is of more than mere academic importance. Mr. Ormsby has presented very effectively the point of view of the reinsuring company and I hope I will be excused if I try to bring out what might be considered as the other point of view, namely, the point of view of an originating company with a billion or more of insurance in force.

I believe that an essential part of the paper is Mr. Ormsby's statement that there is usually higher mortality on reinsured business and that the originating company must pay to the reinsurer at least enough to cover the higher mortality expected. The first part of Mr. Ormsby's statement in regard to the higher mortality of reinsured business would normally be accepted as correct, but the interesting question, of course, is: "Why should this business—business which the originating company knew had a higher mortality—have been issued in the first place at standard rates?" Apart from the question of discrimination, it is possible that the originating company may have thought it could dump its poor risks on the reinsuring company at no extra cost. Back in the 30's, everyone was impressed with the tremendous losses suffered by the reinsuring companies and it is possible that some originating companies still believe that they can outsmart their reinsuring companies. However, within the last few years the second part of Mr. Ormsby's statement has come to be recognized as correct, namely that the originating company must pay enough to the reinsurer to cover the higher mortality expected. At present, the reinsuring companies have sufficient margins, after paying the higher mortality costs, to build up contingency reserves and to start paying dividends to the originating companies. With participating reinsurance, a poor risk passed on to a reinsuring company merely cuts the dividend which the originating company would otherwise receive. If an originating company should issue standard insurance to a borderline risk, it might be more advantageous for it to retain the risk rather than reinsure. In either case, the originating company has to pay for the extra mortality involved, but by keeping the risk it would avoid paying the reinsurance

expense in its own office and in the office of the reinsuring company as well as avoid paying the profit to the reinsuring company for accepting the risk.

Another possible reason for the higher mortality on reinsured business is the readiness with which a reinsuring company is prepared to accept borderline cases at standard rates. It is very difficult for a Home Office underwriter of an originating company to convince an agent that a case should be rated, say at 137½%, when both know that the reinsuring company would take the case on a standard basis. If the agent does not get it issued on a standard basis from his own company, then there are plenty of other companies which can obtain it for him on a standard basis from a reinsuring company. The reinsuring company almost seems to have the power to decide what is the upper limit of standard for the originating company and this upper limit has become very blurred. The only way in which this situation can be remedied is to take the second part of Mr. Ormsby's statement as the absolute truth, namely that the originating company must pay the reinsurer enough to cover any higher mortality. The originating company must pay the higher mortality even if the reinsurer, with his eyes open and after being warned by the originating company, takes a borderline case at standard rates.

Mr. Ormsby's analysis of the gain or loss on expense in the reinsurance transaction is based on the assumption that the business reinsured would not be issued if the reinsurance facilities did not exist or were not used. I would seriously question the validity of this basic assumption made by Mr. Ormsby. If reinsurance facilities did not exist or were not used, many companies, I believe, would have retention limits substantially higher than at present and they would be retaining a substantial portion of the business which they now reinsure. According to classical theory, it is possible to calculate a retention limit which would eliminate undue fluctuations in mortality experience. Life insurance is an interesting combination of theoretical mathematics and hard-boiled realism, and I suspect that mathematics has little to do with the size of the retention limit actually employed by a company. If mathematical theory sets the retention limit, it would be interesting to know why there should be one company with about a billion in force and a retention of $350,000 on one life and another company three times as big, with a retention of less than one-third as much. Instead of the retention limit being set by mathematical considerations, I suspect that with some companies the retention limit is set by the Home Office underwriter who is under two separate pressures. The first pressure comes from Home Office officials who are interested in getting as large a volume of business on the books as possible and who are not much

concerned whether or not the business is reinsured. The other pressure comes from the agent, the agent with the large case, who is interested in getting his case through on a standard basis with a minimum of underwriting requirements, a minimum of underwriting routines and a minimum of underwriting scrutiny. The obvious way for the Home Office underwriter to satisfy these two pressures and yet keep the mortality on retained business as low as possible is to accept a case, say for half a million dollars for his own issue, retain as little as possible, say $100,000, and reinsure $400,000.

If reinsurance facilities were not available, I doubt if the company in question would merely issue $100,000. I suspect that its retention limit would be substantially higher, perhaps $200,000, and that the balance would be offered as surplus or brokerage business to other companies. The agent would probably make as much, if not more, money if he brokered part of the case instead of having it reinsured by his own company, as the price which can be obtained by an agent for prime brokerage business is quite high. I understand that the going price to an agent in Chicago for prime brokerage business is 55% first year commissions plus $3.00 per thousand plus nine fives vested. Or the general agent of the originating company, by means of a reciprocal agreement with the general agents of other companies, could arrange to get back as much business as he gave off in the case in question. I suspect that from the point of view of the agent the main objection to brokering the case is the fact that it would be exposed to the strict underwriting requirements and scrutiny of the one or more companies who accepted his excess business.

The allocation of expenses to reinsured business is a difficult problem but I am not convinced that all the overhead and indirect expenses on the half a million dollar case should be charged to the $100,000 policy retained by the originating company.

Even if we were to accept the basic viewpoint presented by Mr. Ormsby in regard to expenses, there are still some other questions which might be raised in regard to his expense analysis. His analysis is based on one expense allowance and one sample of expenses. Since there are about 600 companies in the country with reinsurance agreements and each company has probably a different pattern of expenses, it must be left to each company to decide for itself whether or not its direct expenses can be met by the expense allowance in its reinsurance treaties. I believe that most of the companies which reinsure business are on the general agency system where the percentage of direct expenses is inclined to be higher. The company which Mr. Ormsby considered was on a managerial system and some of the expenses which he could class as overhead would require, I

believe, to be classed as direct expenses for a general agency company and hence would be charged against the reinsured business. Incidentally, for a number of years we had the practice of refusing to pay part of the direct expenses to the general agent on reinsured business on the grounds that the expense allowance granted by the reinsuring company would not permit us to do so. However, we had so much trouble with this system that we finally decided that we would pay the normal direct expenses to the general agent whether or not the business was reinsured.

Mr. Ormsby points out that with a low net cost company, the expense allowance would be confined to commissions. Since such a company would almost certainly have other direct expenses—particularly if it is on the general agency system—it seems obvious that the low net cost company would always show a loss on the expense basis.

Mr. Ormsby concentrates his attention almost exclusively on expenses, but in reinsurance there are, I believe, far more important questions than expenses. Reinsurance, either on the yearly renewable term basis or on the modified coinsurance basis, consists of transferring to a reinsuring company the mortality on large policies. The mortality on big risks is at present quite good and it is reasonable to believe that over the next 10, 20 or 30 years, the mortality on this type of risk will continue to be good. Large policies are usually sold at the middle and upper ages and it is reasonable to expect that there will be at least one major advance in geriatrics within the next few years. Even one advance, such as the practical elimination of cancer as a mortality hazard, would have quite an effect on the mortality of reinsured business. It should be noted that the class of policyholders in question will be in the position to take immediate advantage of any improvement in medical science. The men who constitute the class of big policyholders have had much to learn in the way of avoiding the stress and strain of modern living, but I believe they are learning fast and that the lessons will be reflected in improved mortality on big risks. Incidentally, a high income tax rate with its lack of incentive to overwork and premature death has, I believe, an important effect on the mortality of big risks. It is reasonable, of course, to believe that there will be temporary fluctuations in the mortality, and the ease with which big risks are accepted at the present time suggests that we are entering into a period of higher mortality. Such a period may also cause high mortality among Home Office underwriters who have accepted and retained large risks but, if the temporary fluctuations can be lived through, the mortality on large risks as well as on Home Office underwriters should be very good.

There will always be a question, of course, of how large a policy should

be retained by the originating company and I would like to offer the opinion of Mr. Henry Jackson to the effect that for a strong, well-managed company, with strict underwriting not susceptible to agency pressure and with a billion or more in force, there should not be any upper limit to the size of policy retained.

The originating company, having passed on to the reinsuring company the mortality on large risks, is confronted with a miscellany of problems on its retained business. Perhaps the biggest problem facing an insurance company today is the control of expenses and this problem is certainly not made any easier by having a substantial volume of reinsured business averaging $20,000 per policy against which overhead and indirect expenses cannot be charged. As Mr. Ormsby is careful to point out, an expense analysis must be based on retained business and if policies averaging $20,000 are reinsured, the average size of retained business must be low, leading to high expense rates per thousand. The next major problem which an insurance company has to face is the strengthening of reserves for settlement options and annuities and I suspect that much of the strengthening to be done would normally come from mortality profits. The mortality on reinsured business is, of course, not available to provide any help. It is probably also the practice for the originating company to maintain a surplus at least equal to 5% of the reserve whether or not the business is reinsured. If so, the company has to set up this surplus even though there is no mortality profit to contribute to it. Also the company has the problem of getting margins sufficient to finance the heavy cost of additional new business, and here again reinsurance is not going to provide any help.

It is not outside the bounds of possibility that it is the business which is reinsured that will prove to be the desirable business 20 years from now and that the policies which are retained will provide the headaches for the future executives of the originating company. In reinsurance it would sometimes appear as if the originating company had given away the kernel of the insurance and retained the empty husk.

The above should not be taken to mean that I am against reinsurance as such. As a matter of fact we use reinsurance quite freely for substandard business but we make a practice of not reinsuring standard business. The method which we use to determine the cost of reinsurance has at least the virtue of simplicity. We are on the modified coinsurance basis and we simply take the difference between what we pay the reinsuring company and what they return to us as the cost of reinsurance. Over the last 9 or 10 years, our reinsurance costs have averaged between $4.00 and $5.00 a year per thousand in force and we regard this as a legitimate underwriting

expense or mortality loss to be charged against the Selection Department. If we had had the knowledge and skill of the reinsuring company, we would have retained all the substandard business we reinsured. The reinsuring companies are larger, more up-to-date, more sensitive to change, have better statistics on substandard than we have, and we believe it is only proper that they should be paid for the use of their facilities. On the other hand, we do not believe that reinsurance is of any use to us in smoothing out mortality fluctuations.

The above method of measuring the cost of reinsurance can be used for standard business as well as for substandard business, with the excess of what is paid to the reinsuring company considered as a mortality loss or a mortality expense to be charged against the mortality of the originating company. The skill of the underwriter of the originating company should not be measured merely by the mortality on the business which is retained but should also be measured against the mortality on the business which he reinsures and for which his company has to pay. It obviously takes little skill or sense of responsibility to be a Home Office underwriter if the underwriter can pass on to a reinsuring company any doubtful, any borderline or any very substantial case and yet not be charged with the net loss suffered by his company on the business which he reinsured.

Returning again to the fundamental premise laid down by Mr. Ormsby, the originating company must pay to the reinsurer at least enough to cover the higher mortality expected on reinsured business and such payments should be a direct charge against the underwriter of the originating company.

PHILIP FREEDMAN:

In his paper, Mr. Ormsby demonstrates one possible actuarial approach to the determination of the cost to reinsure individual life insurance policies. Illustrations of this approach are given for the coinsurance plan in Table 1 and for the yearly renewable term plan in Table 3. In the case of the coinsurance plan, where the ceding company merely acts as a broker for the reinsurer, no difficulty arises in determining a clearly defined cost. The accumulated cost in this case is simply the accumulated difference between the ceding company's income and outgo. This accumulated cost also represents the accumulated effect of the reinsurance arrangement on the ceding company's surplus. Such a cost may be referred to as a "statement cost."

The cost of reinsuring on the yearly renewable term plan is a somewhat more flexible concept. Mr. Ormsby assumes that the accumulated cost as of any duration is the excess of the original policy's cash value over the

accumulation of premiums less expenses and other payments. This concept of cost is predicated on the equivalence of cash values and asset shares. It is not a "statement cost" at a duration at which the cash value differs from the reserve.

Mr. Ormsby's tables show very clearly the processes to be used when "out-of-pocket costs" are to be determined. However, if the effect of the reinsurance arrangement on the ceding company's surplus is an important consideration, it will be desirable to examine the "statement cost" as well as the "out-of-pocket cost." Derivation of the "statement cost" merely involves the substitution of the policy reserve for the cash value in column 8 of Table 3 of the paper. The following table compares "out-of-pocket costs" and "statement costs" when reserves are taken as CSO 2½% net level premium reserves:

COMPARISON OF COSTS TO REINSURE PART OF A POLICY
ON THE YEARLY RENEWABLE TERM PLAN
ORIGINAL POLICY: STANDARD O.L.—AMOUNT OF REINSURANCE: $1,000
ISSUE AGE: 25

Policy Year	(1) Out-of-Pocket Cost	(2) Statement Cost	(3) Difference (2)−(1)	Policy Year	(1) Out-of-Pocket Cost	(2) Statement Cost	(3) Difference (2)−(1)
1.....	− 1.95	9.25	11.20	11.....	− 7.98	5.02	13.00
2.....	−10.35	11.11	21.46	12.....	− 8.23	3.99	12.22
3.....	− 8.18	11.94	20.12	13.....	− 8.66	2.94	11.60
4.....	− 7.33	11.70	19.03	14.....	− 9.25	1.83	11.08
5.....	− 7.44	10.71	18.15	15.....	− 9.47	.71	10.18
6.....	− 7.08	9.82	16.90	16.....	−10.37	− .45	9.92
7.....	− 6.98	8.91	15.89	17.....	−10.88	−1.63	9.25
8.....	− 7.10	7.97	15.07	18.....	−11.53	−2.83	8.70
9.....	− 7.42	7.02	14.44	19.....	−12.29	−4.06	8.23
10.....	− 7.92	6.03	13.95	20.....	−12.72	−5.30	7.42

It will be noted that the difference between the two costs is generally decreasing and that there will be no difference at the duration at which the cash value becomes equal to the reserve. The difference in the first policy year arises in part from the fact that the cash value is not a good approximation to the asset share, and this may, perhaps, apply to the second and third years as well. Where this situation exists, the costs shown in column 1 above are not good approximations to the "out-of-pocket costs." This, of course, is not a matter of great concern since it is unlikely that anyone would wish to determine the average cost over the first two or three policy years. I think it should be pointed out, however, that while Table 3 of the

paper gives a good description of the accumulated cost for durations beyond the second or third, it does not present a true picture of the incidence of the cost in the early policy years.

The "statement costs" shown above reveal the level and incidence of the cost of partially reinsuring an individual policy on the Y.R.T. plan as it is reflected in the surplus position of the company. It is, of course, possible to derive from these costs average annual costs similar to Mr. Ormsby's. Another sort of average annual cost may be derived from either the "out-of-pocket costs" or "statement costs" by developing a model office to a stationary condition. Such a model office based on "out-of-pocket costs" should yield a good estimate of emerging reinsurance costs. If the model office is used, rather than the weighting of average annual costs in the manner of Mr. Ormsby's Tables 2 and 4, it would be important to use asset shares rather than the cash values in the first two or three policy years.

In my own company, we have, from time to time, attempted to determine the relative merits of coinsurance and Y.R.T. from a cost standpoint, using a method very similar to Mr. Ormsby's. It may be pointed out that when a comparison of this sort is undertaken it is not necessary to allocate expenses which are common to both plans of reinsurance. As Mr. Ormsby's paper shows so clearly, such investigations cannot be made on a superficial basis without close regard to the distribution of ceded business by age at issue and plan of insurance. For the distributions assumed in the paper, the coinsurance plan appears more favorable to the ceding company, but the reverse may be true for other distributions. Furthermore, the results may be different for substandard business. In smaller companies, where substandard cases may comprise a major part of the reinsured business, the distribution by underwriting class will be a major factor in the problem.

Mr. Ormsby is to be congratulated for presenting a thorough exposition of the technique of determining reinsurance costs. His work will be of great value to all companies interested in the subject.

ALVIN B. NELSEN:

The members of the Society may be interested in the type of analysis made by a participating company which recently entered into a reinsurance arrangement for Ordinary business. Mr. Ormsby's paper was of particular interest since we made a somewhat similar study of the anticipated costs of the various types of reinsurance arrangements.

Our study was based upon examining the year-by-year costs on a model office distribution of business which we expected to reinsure, assum-

ing for simplicity that all reinsured business would be on the Ordinary Life plan with a somewhat older age distribution than our regular business. We considered separately the costs of partially reinsured and fully reinsured business.

For partially reinsured business on the Yearly Renewable Term plan, the yearly costs were determined approximately as the excess of items 1 and 2 over items 3 and 4 defined as follows:

1. Yearly Renewable Term premiums paid to the reinsurer on the net amount at risk less an allowance for premium taxes.
2. The expenses directly incurred with respect to the additional amount of business accepted and reinsured which would not have been incurred if the business had been declined (*i.e.*, expenses in excess of those already incurred on the portion of each case which the company retains)—such as agents' commissions and benefits, a part of the managers' compensation and benefits, and premium taxes—including the expenses incurred in administering reinsured business.
3. The effective charge for mortality with respect to the reinsured net amount at risk as determined from the company's select and ultimate mortality rates used in the asset share tests of the dividend scale.
4. The effective charge made by the company for expenses with respect to the reinsured business based on the expense rates used in asset share tests of the dividend scale.

From the above items used to determine the cost of Yearly Renewable Term it is readily apparent that the cost in a year with respect to reinsured business in force is independent of the mortality actually experienced (except as may be reflected in the charges by the reinsurer). I might note that the above formula measures the cost of reinsuring the business if the aim is to accumulate asset shares for reinsured business at the same level as on regular fully insured business with the reinsured business placed in the same surplus position as fully insured business.

For partially reinsured business on the coinsurance plan we made a similar study of the yearly costs, comparing the reinsurer's expense allowances with the expenses directly incurred with respect to the reinsured business which would not have been incurred if the business had been declined.

With respect to cases that are fully reinsured our studies showed that this type of business is appreciably more costly than partially reinsured business based upon assessing full expenses including overhead. We considered separately the costs of (1) cases under which declination by our company would not be expected by our agents (in which cases the cost of

reinsurance should not include underwriting costs) and (2) cases which would not be submitted by our agents except for our reinsurance facilities (in which cases the cost of reinsurance should include underwriting costs).

B. FRANKLIN BLAIR:

Mr. Ormsby is to be congratulated on presenting a well-organized paper on an important subject. It will be of interest to many of us who have studied the cost to reinsure policies from the viewpoint of the ceding company rather than from Mr. Ormsby's viewpoint.

Mr. Ormsby has confined his attention to determining the cost to reinsure business which the ceding company would otherwise not have issued. On this basis, "the ceding company's cost to reinsure is the same regardless of the actual mortality on the amount it reinsures," as he points out. However, the expenses assigned to the reinsured business do affect the results significantly, as shown in his Tables 2 and 4. The basis of assigning expenses is, of course, a debatable matter, particularly in the case of business which would not have been submitted to the ceding company if a reinsurance outlet had not been available.

But there is another question which confronts an actuary who is trying to determine whether to increase retention limits at ages where the retention is less than his company's maximum or to decide whether to reinsure part (or all) of a risk which is borderline in some respect. This question is: "What would be the cost of reinsuring this business as compared with retaining it?"

Several years ago, the Provident Mutual studied this question. We confined our studies to coinsurance of Ordinary Life policies (most of our ceded policies are on either Ordinary or Modified Life forms).

As the direct expense on a given policy is the same whether that policy is reinsured or retained, the amount of direct expenses makes no difference in determining the answer to this question. The items which affect the answer are the premiums (or net costs, if participating) and cash values of the ceding company, the mortality and withdrawal rates of the policies involved, the interest rate, the allowances from the reinsurer for expenses, commissions and premium tax, and the extra cost to the ceding company of handling reinsurance. This last item is, of course, usually comparatively minor; we used \$.20 per \$1,000 insurance per year in our studies.

Fortunately for comparison with Mr. Ormsby's results, we used the same expense allowance as he used for coinsurance, namely 20% of first premiums and 1% of renewals. Because the cost to reinsure rather than retain business is still material at the longer durations, we carried our calculations for more than the 20 years used by Mr. Ormsby.

Our results for standard Ordinary Life policies are summarized in the following table.

Age at Issue	Number of Years over Which Results Were Measured	Cost per Year of Reinsuring an Entire Policy As Compared with Retaining It, Assuming Normal Provident Mutual Mortality		Level Increase in Mortality Which Would Offset Cost of Reinsuring As Compared with Retaining
		Level Cost per $1,000 per Year	Cost As a Level % of Premium	
25	35	$2.12	9.9%	103%
35	35	1.94	6.8	45
45	30	2.33	5.9	29
55	25	4.34	7.4	30

It should be emphasized that these figures apply only to one particular set of assumptions, that they ignore the expenses of the reinsurer and that they are based on the unrealistic assumption that mortality on the business under consideration will be normal. Nevertheless the figures in the last column indicate that under certain circumstances it may be cheaper to retain rather than to reinsure certain blocks of business, even though the mortality on such business seems likely to be slightly over normal.

RICHARD C. GUEST:

I am prompted to say a few words apropos of what my very good friend Archibald McAulay started out with. Whereas Mr. McAulay believes you should reinsure substandard and not reinsure standard business, I believe you should not reinsure except for size. Reinsuring initial small amounts of substandard business is tantamount to admitting that you are passing on to the reinsurer the responsibility for involved selection and rating.

I think it could be demonstrated in any mutual company that the margin in the nonparticipating extra premium in a substandard case is much larger, per thousand, than that in the standard participating premium diminished by dividend, although it probably is true that due to competitive underwriting and, to some extent, to competitive rate making, the premium margin in the early classes of substandard, particularly Class A, is becoming somewhat like the standard margin.

The reinsurers have contributed greatly to advances in selection methods and are accordingly entitled to a reasonable profit. The occasional tendency to pass known bad risks on to reinsurers could result in the

elimination of profits which would otherwise accrue to the originating companies through the recently developed sharing of profits with the originating companies.

(AUTHOR'S REVIEW OF DISCUSSION)

CHARLES A. ORMSBY:

Mr. McAulay expresses many interesting and perhaps a few unusual opinions on the subject of reinsurance. Although I feel that his discussion to some extent goes beyond the cost question dealt with in the paper, in the interests of clarification and of presenting additional points of view I should like to comment on a few of his observations.

With reference to the higher mortality on lives reinsured, Mr. McAulay raises the question: "Why should this business—business which the originating company knew had a higher mortality—have been issued in the first place at standard rates?" As possible reasons for this higher mortality, he mentions the following:

1. ". . . the originating company may have thought it could dump its poor risks on the reinsuring company at no extra cost." Despite the unfavorable mortality experienced by reinsurers in the 1930's, "it is possible that some originating companies still believe that they can outsmart their reinsuring companies."
2. ". . . the readiness with which a reinsuring company is prepared to accept borderline cases at standard rates."

To a limited extent, the above two reasons for higher reinsurance mortality have been and are currently operative. A reinsuring company which is receiving a substantial volume of business from a particular client is not going to insist that each and every case ceded must be of the highest quality. Whether reinsurance is involved or not, it is common practice for the direct-writing companies to perform occasionally a similar service for their own agents, and properly so.

However, the reasons which he enumerates as possible explanations for the higher reinsurance mortality do not apply to the typical policy that is reinsured. We should not overlook the cyclical fluctuations which are characteristic of the large amounts reinsured, for which provision must be made by the reinsuring company in its estimate of expected mortality. A ceding company does not reinsure a representative cross section of its issues but only those amounts in excess of its own retention, whether such retention be regular or limited, so that even if the same underwriting standards are imposed the expected mortality of the ceding company cannot properly be taken as a measure of the expected mortality on the

amounts reinsured. When Mr. McAulay in his second paragraph questions the propriety of issuing reinsured business at standard rates merely because the mortality is higher, I believe he may be overlooking one of the characteristics of reinsurance mortality which distinguish it from direct mortality. As a simple illustration of this point, a parallel can be drawn between two direct-writing companies that might have distinctly different premium rates for standard Ordinary insurance solely because their expected mortality rates may be different. Would one conclude that the unrated policyholders of the company with higher premiums should not be considered standard risks?

Numerous investigations over a period of many years have disclosed that mortality by amounts is greater than by policies, thereby demonstrating time and again the effect of the larger amounts on the results. While it is true that the mortality on large amounts as reported by the Committee on Mortality has been relatively low within recent years, the period of observations has not embraced a severe economic depression and thus is not such as to justify the conclusion that major adverse cyclical fluctuations, to which in the past the larger amounts have been especially sensitive, will be absent from future experiences. Even though one may point to the improved techniques that were adopted in the 30's for underwriting jumbo risks as affording some protection against adverse cyclical fluctuations, in the opinion of many the industry does not as yet have adequate assurance that such fluctuations will fail to appear in future mortality investigations.

In his third paragraph, Mr. McAulay expresses concern over what he calls the readiness of a reinsuring company to accept borderline risks as standard. Entirely apart from the extent to which this may be a characteristic of reinsurers today and without regard to the divergent views which are held on this issue, I share his sentiments as to the implications of any such practice for the originating companies. The reinsurance program of the original company should not involve in any way a compromising of its own underwriting policy. The reinsurer should not interfere, either directly or indirectly, with the job that the original companies' underwriters have in discharging the over-all responsibility of administering their own underwriting policy, which policy is presumably a sound expression of the pertinent circumstances and objectives of the original company.

In the paper I indicated that the determination of the appropriate amounts to be retained by the original company was not within the scope of the paper and that any amounts issued in excess of the limits adopted were to be considered eligible for reinsurance. Mr. McAulay chooses to

transcend this limiting assumption and does so with a number of intriguing observations on the subject of retention limits. I am inclined to agree with him that if reinsurance were not available, retention limits would be higher than they are now. However, I would choose to proceed on the assumption that the retention limits now in effect are to a great extent the result of intelligent consideration by the managements concerned and that if higher amounts were to be retained in the absence of reinsurance facilities, the companies doing so would be exposing their mortality experiences to irregularities from which they now have sound protection.

I am in complete agreement with Mr. McAulay that the theory of mathematical probability has only a small role to play in constructing life insurance retention schedules. Nevertheless, I believe that differences in average size policies and in age distributions could account for a substantial difference in maximum amounts within the confines of the applicable mathematical theory. It is highly probable, however, that in the particular example he cites, other considerations, some undoubtedly subjective, account for a large part of the difference in maximum retentions.

In discussing the problem of retention limits, Mr. McAulay uses as an illustration a policy for $500,000, of which $100,000 is retained and $400,000 reinsured. This is indeed an extreme case and should not be taken to illustrate the typical reinsurance cession if erroneous conclusions are to be avoided. For example, he uses this case in questioning the propriety of assigning all the overhead expenses to the amounts retained. If a company is reinsuring a high percentage of its total new issue and a large number of cessions are such that 80% of the policy is ceded, then there should perhaps be unanimity in disapproving the suggestion that all the overhead expenses be borne by the amounts retained. However, the average company with a sound reinsurance program reinsures only a small percentage of its business, say not more than approximately 10%, and cedes many cases where the amount of reinsurance is less than 80% of the face amount of the policy.

With regard to this question of assigning overhead expenses, it is interesting to note that some companies intentionally omit any provision for overhead expenses in their premiums for the Family Income rider or other forms of term rider, so that the notion of not charging a proportionate share of general overhead to all coverages issued is not an entirely new one. The analogy is that the parent policy, so to speak, bears the overhead charges.

In the latter part of his discussion we are told that reinsurance "consists of transferring to a reinsuring company the mortality on large poli-

cies" and that "it would sometimes appear as if the originating company had given away the kernel of the insurance and retained the empty husk." These observations appear to be somewhat at variance with the references made earlier in the discussion to the "dumping" of poor risks on the reinsurer, the "outsmarting" of the reinsurer by the originating companies and the "readiness" of the reinsurer to accept borderline cases at standard rates. Nevertheless, I was very much interested to learn of the factors which he believes point to more favorable mortality in the future on large policyholders, in particular the effect of a high income tax on this class of risk. It seems to me that the opposite effect is also possible. As a result of the high income tax, the large policyholders may have greater inducement than ever to purchase insurance in larger amounts as the best and surest way of creating the estate desired. Incidentally, the incentive for circumvention created by the high tax rate may not be entirely conducive to longevity.

I find myself unable to accept the statement that "for a strong, well-managed company, with strict underwriting not susceptible to agency pressure, and with a billion or more in force, there should not be any upper limit to the size of policy retained." Although it is true that a company's concern over serious chance fluctuations in its mortality is not the only factor to be considered in deciding upon an appropriate schedule of retention limits, the fact remains that some recognition must be accorded this factor if a reasonable distribution of amounts with respect to the average size is to be assured. Even a company with many billions in force should not ignore the control that can be obtained by setting its retention limits with a view toward a distribution of amounts of insurance about the average amount which will tend to promote the stability desired in the expected mortality. To take an extreme case, a company, regardless of its total in force, would likely be going contrary to sound management if with an average size policy of $5,000 and no policy in excess of $50,000, it were to be willing to issue for its own risk a relatively few cases for, say, $500,000. I believe this is true even if it is assumed that the underwriters of the company concerned can soundly appraise such large amounts.

In connection with the principle of not assigning certain expenses to the amounts reinsured, Mr. McAulay feels that "if policies averaging $20,000 are reinsured, the average size of retained business must be low, leading to high expense rates per thousand." Apparently the paper was not clear on this point. I was referring to the portion of the policy reinsured, not to the size of the original policy issued by the ceding company. Obviously, it is to be doubted that there is necessarily any such relation between the average amount reinsured and the average amount retained,

the former being simply a function of the amounts *in excess of* a company's retention, and the latter of the amounts *within* a company's retention. As a matter of fact, it is reasonable to expect that whenever a company has an issue limit greater than its retention, its agents will be encouraged to write a larger average size policy within its own retention limits, with a resulting favorable effect on expense rates.

Mr. McAulay's definition of the cost to reinsure is the difference between the premiums paid to the reinsurance company and the sum of all payments made by the reinsurer to the ceding company. This is a retrospective concept of cost and one that is distinctly different from the concept set forth in the paper. The costs considered in the paper are projected or prospective costs, not retrospective or "after the fact."

There are a number of objections which might be raised against the use of the retrospective concept of cost, a few of which might be mentioned here. In the first place, one frequent reason for reinsurance is to avoid irregularities of some consequence in the mortality to be experienced. These irregularities, so to speak, are passed on to the reinsurer who in turn merges them with similar cessions from a number of other clients and in this manner achieves the stability he (the reinsurer) requires for his own operations. Costs based on this retrospective concept, even if there were no other drawbacks, would fluctuate accordingly from year to year.

Retrospective costs based on a period of many years would tend to be free of the disruptive fluctuations mentioned above. However, at the end of the period, such costs would fail to be a good yardstick for a program to be followed in the future because of the obsoleteness of the underlying data. In the intervening years, the reinsurance premiums and other determining data may have changed radically. The terms for reinsuring present-day excess amounts may very likely be far different from those which prevailed when the experience for the retrospective cost figures began to unfold.

Apart from the retrospective aspect of Mr. McAulay's concept, his method of determining reinsurance costs differs from the method described in the paper in another important respect. Whereas the cost to reinsure as defined in the paper is such that the profit margin in a company's gross premiums is regarded as part of the margin which is available to pay, at least in part, whatever price is agreed upon for the reinsurance services, the cost as defined by Mr. McAulay does not include this margin and is based on the premise that the ceding company is to make the same profit on amounts reinsured as on amounts retained. A simple example will perhaps help to clarify this second difference between the two approaches. Suppose that the profit per thousand of insurance is $2 and that

the cost to reinsure according to Mr. McAulay's definition is $3 per thousand. On each thousand that is issued and reinsured, Mr. McAulay would ignore the $2 per thousand profit from the transaction with his own policyholder in computing his cost to reinsure, even though the reinsurer is carrying at least the mortality portion of the risk. The approach used in the paper would apply the $2 profit to defray part of the cost to reinsure. It is to be stressed here that the foregoing example is an oversimplification of a more involved procedure, for the method in the paper recognizes, among other things, the administrative expense incurred by the original company in ceding reinsurance, and distinguishes between policies which are fully reinsured and those where only a portion of the face amount is regarded as excess.

In connection with his method of determining reinsurance costs, Mr. McAulay says: "If we had had the knowledge and skill of the reinsuring company, we would have retained all the substandard business we reinsured." I believe this means that on the substandard business which is reinsured, his company depends on the underwriting know-how of the reinsurer. If this interpretation is correct, I am somewhat perplexed by the statement in his next paragraph that: "The skill of the underwriter of the originating company should not be measured merely by the mortality on the business which is retained but should also be measured against the mortality on the business which he reinsures. . . ." It is not entirely clear to me how one can measure on the basis of the risks under consideration the skill of the ceding company's underwriters when in this particular case it is the skill of the reinsurance company's underwriters that determines the underwriting evaluation.

While the retrospective cost as defined by Mr. McAulay should be of interest as an index of the experience to date, I do not feel that it is the best method to employ for determining the course of action to be followed in the future with respect to the amounts to be issued and reinsured.

Despite my contrary views on some of the points Mr. McAulay has raised in his discussion of the paper, I thoroughly enjoyed reading his thought-provoking contribution and am personally grateful for the detailed attention he has given the paper. I am sure I speak for both of us in saying we appreciate the opportunity the Society affords us for expressing to all members our individual views, even though they may differ in a number of respects.

In his discussion, Mr. Freedman introduces the concept of "statement" cost and indicates the equivalence of "statement" cost and "out-of-pocket" cost when the plan of reinsurance is coinsurance. However, as he points out, they are not the same for the Yearly Renewable Term plan

when the cost is averaged over a period at the end of which the policy cash value is not equal to the reserve.

Mr. Freedman directs our attention to a worth-while aspect of the subject by stating that whenever a company which is reinsuring on the Yearly Renewable Term plan wishes to know the effect of the reinsurance transaction on the emergence of its own surplus from year to year, the policy reserve would replace the cash value in column 8 of Table 3. This could very well be an important consideration for a young company.

Mr. Blair presents a specialized approach to the problem of determining reinsurance costs which may be helpful to an actuary confronted with such specific questions as:

1. Should the company's retention limits be raised at ages where the present limit is less than the over-all maximum?
2. Should the company reinsure part or all of a risk which is borderline in some respect?

Following a particular set of assumptions, cost figures were developed by Mr. Blair's company from which he concludes that "under certain circumstances it may be cheaper to retain rather than to reinsure certain blocks of business, even though the mortality on such business seems likely to be slightly over normal." Does a ceding company ordinarily want to reinsure or to consider reinsuring a particular block of business (such as borderline risks) solely for the reason that its mortality each year is higher than normal? Whether such risks are retained or reinsured, additional cost is involved. Assuming that the business in question cannot be underwritten more searchingly by the reinsurance company than by the original company and that mortality fluctuations of consequence are not a factor, I would fail to see any real need for reinsuring such business and would offer the opinion that under these circumstances, all policies in this category which are not excessive with respect to amount of coverage be retained by the original company. Those original companies which wish to have an independent underwriting appraisal of this difficult type of case from their reinsurer face an entirely different situation.

As I understand Mr. Nelsen's summary, his company analyzed the anticipated costs to reinsure along lines in many respects similar to those described in the paper, including the distinction between policies which are wholly reinsured and those where only a portion of the face amount is regarded as excess. He also projects costs which are independent of the mortality actually experienced on the amounts reinsured and confirms the conclusion that the cost to fully reinsure is appreciably higher than the cost to reinsure part of a policy. The description of his analysis should be

particularly interesting to a company issuing and reinsuring participating policies.

Mr. Nelsen points out in commenting on the analysis he used for reinsurance on the Yearly Renewable Term plan that his formula measures the cost "if the aim is to accumulate asset shares for reinsured business at the same level as on regular fully insured business with the reinsured business placed in the same surplus position as fully insured business." If this is a criterion which Mr. Nelsen's company wants to satisfy on amounts reinsured, certainly no outsider should judge the method by a different standard. However, since the reinsurer is carrying the mortality portion of the risk and whatever contingency fund may be required, there may be some who feel that the original company need not accumulate on the amounts ceded asset shares at the same level as on the business retained. This minor comment is not intended to detract in any manner from Mr. Nelsen's excellent discussion of a method of analysis that has considerable merit.

In contrast to the point of view presented by Mr. McAulay, Mr. Guest believes that only those amounts should be reinsured which are too large for the original company. For many companies and for a large number of the policies reinsured, this is the only valid reason for calling upon the services of a reinsurer, and I was pleased that Mr. Guest brought out this important point in his remarks. Later on in his discussion, he pointedly draws our attention to the unsoundness of the concept that reinsurance should be resorted to as a means of bargaining away risks of poor quality.

I want to thank Messrs. McAulay, Freedman, Blair, Nelsen, and Guest for taking the time to give us the benefit of their comments. Their discussions represent a valuable supplement to the paper.

I wish to record here also my gratitude to Messrs. W. V. B. Hart and C. T. Green of my company for their constructive criticisms and suggestions, which were of considerable assistance to me in preparing the paper.