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FURTHER NOTES ON THE TREND OF LIFE INSURANCE COMPANY EXPENSES

ARTHUR PEDOE

THIS study may be regarded as a continuation of that presented by the author to the Society of Actuaries in 1952 (*TSA* IV, 485). As different basic formulas are used and circumstances have changed, the present paper will attempt to be inclusive.

The purpose of the 1952 paper was to trace the change in company expenses, comparing the six postwar years 1946 to 1951 with the prewar year 1939. It was a study of the twenty largest Canadian incorporated life insurance companies, omitting those doing industrial business. All but one are federally licensed. The present study of the same companies, while tracing back results to compare with 1939 and 1948, concerns itself mainly with trends in the period 1952 to 1959. A study of group insurance and group annuity expenses is also given.

This investigation originated in an annual report to the Canadian Association of Actuaries, first made in 1950. It arose as a personal venture by the author but has come to be accepted as an official investigation by that body.

The 1952 paper to the Society was on the defensive in suggesting that an over-all expense ratio had some value. The accepted attitude at that time may be expressed in the following summary by a noted actuary-president[1] made in 1949 and possibly still accepted by many today:

Unfortunately, there is no method for comparing one company with another:
(1) There is no standardized accounting as in other industries.
(2) The annual statement is useless for such comparisons.
(3) Over-all ratios such as those used by insurance publications are also useless.

This is the counsel of despair and explains why so little has been published on the subject. Apart from the 1952 paper with these yearly reports

[1] McConney, Edmund M.: "Effective Expense Control in the Home Office," Life Insurance Association of America, May 11, 1949.

to the C.A.A. and a recent gallant effort based on companies in the United Kingdom,[2] nothing has appeared in actuarial journals on the trend of expense ratios for many years.

For an expense ratio to mean anything there must be a basis for comparison with other companies operating in the same field. It is agreed that analysis of costs by function of operation, *i.e.*, a functional cost analysis, is most desirable and the efforts of the Life Office Management Association in this regard are to be commended. However, the slow progress and disappointing results of their efforts may emphasize that companies are as different in their operations as the people who run them. It is not just an accounting matter.

An Over-all Ratio

The many years of discussion and correspondence regarding the C.A.A. reports have impressed me more than ever with the value of over-all ratios. Originally in this investigation investment expenses and commissions were omitted in determining the ratio of actual to expected expenses. However, for some years the C.A.A. figures have been based on an over-all ratio of all actual expenses to those expected according to certain adopted formulas.

Although these reports were originally introduced having the smaller companies mainly in view, the interest of the larger companies has become increasingly engaged. It is recognized that an over-all ratio is but the first step so far as an individual company is concerned. The ratios obtained by the simple formulas adopted have been accepted over the years as giving a fairly accurate picture of expense trends in Canada; this is also possibly the case for expense trends in the United States. The pressure on actuarial staffs has increased considerably in recent years, which may explain the increasing interest in the method herein outlined in the United States and the United Kingdom besides Canada.

THE MATERIAL USED

Throughout the paper the phrase "ordinary" when applied to life insurance and deferred annuities means "nongroup" business. Amounts given of sums insured and premiums are after deduction of reinsurances.

The twenty Canadian companies contributing to the investigation were divided into two classes: ten larger (L) companies with ordinary insurance in force at the end of 1959 exceeding $750 millions and ten smaller (S) companies. The ordinary insurance in force of these S companies in no case exceeded $500 millions at the same date. The six larger

[2] Dyson, E. J. W., and Elphinstone, M. D. W.: "The Expenses of British Life Offices," *JIA* LXXXV, 211 (1959).

companies and four medium sized companies of the 1952 paper have been classed together for this analysis.

There are some 33 Canadian incorporated life insurance companies with Canadian federal licenses and some 19 licensed by the provinces. All told there are approximately 100 companies transacting life insurance business in Canada. The twenty contributing companies represent about two-thirds of the combined premium income of all Canadian life insurance companies and of the business in Canada of other companies. The years of operation of the twenty contributing companies vary from 37 years to over a century.

SUMMARY OF RESULTS

Table 1 gives the ratios of actual to expected expenses by the two formulas outlined in Table 2. In Table 3 are given the average sums insured and premiums per new policy effected and the corresponding premiums per thousand sum insured. These three tables give the final results of the investigation.

TABLE 1

RATIOS OF ACTUAL TO EXPECTED EXPENSES

Year:	1939	1948	1952	1956	1957	1958	1959
	Formula I						
L Companies	94%	94%	101%	108%	111%	113%	114%
S Companies	97	99	111	118	123	125	129
	Formula II						
L Companies	77%	80%	87%	95%	97%	99%	101%
S Companies	76	80	91	99	103	106	109

It will be noted on the bases used that

a) The rate of expense which in 1948 approximated to or was slightly above that of the prewar year 1939 has consistently increased year by year since then (Table 1).

b) The average new sum insured per policy effected has increased by 1959 to three times and more the amount it was in 1939 (Table 3).

c) The average annual premium per thousand new insurance which in 1948 was equal to or above what it was in 1939 has steadily decreased year by year since then (Table 3).

d) The average annual premium per new policy has risen year by year and in 1959 was from two to two and a half times what it was twenty years earlier in 1939 (Table 3).

BASES

The procedures used with appropriate comments are enumerated below.

1. *International Scope.* Although this investigation deals with Canadian incorporated companies, it has a wider significance as the majority of the

TABLE 2

EXPENSE FACTOR FORMULAS
(INCLUDING COMMISSION AND TAXATION)

Item		Formula I	Formula II
ORDINARY INSURANCE			
1st Year			
Number of Policies	per policy.....	$25.00	$50.00
Sum Insured	per thousand.....	$ 5.50	$ 5.50
Revenue Prem. Inc.	percent.....	70%	70%
Renewal			
Number of Pols. in force end of year	per policy.....	$ 5.00	$ 6.00
Sum Insured in force end of year	per thousand.....	$ 0.45	$ 0.50
Revenue Renewal Prem. Inc.	percent.....	5½%	7.35%
ORDINARY DEFERRED ANNUITIES			
1st Year			
Number of Policies	per policy.....	$25.00	$40.00
Sum Insured*	per thousand.....	$ 5.50	$ 5.50
Revenue Prem. Inc.	percent.....	48%	48%
Renewal			
Number of Pols. in force end of year	per policy.....	$ 5.00	$ 6.00
Sum Insured* in force end of year	per thousand.....	$ 0.45	$ 0.50
Revenue Renewal Prem. Inc.	percent.....	2½%	4%
Single Ord. Ins. Premiums	percent.....	5%	7%
" Ord. Annuity Premiums	"	4½%	5%
Group and Miscellaneous		*Both Formulas*	
1st Year Group Ins. Premiums	percent.....	55%	
Renewal " " "	"	10%	
Single " " "	"	5%	
1st Year Group Annuity Premiums	percent.....	17%	
Renewal " " "	"	6½%	
Single " " "	"	3%	
T.D.W.P. in force end of year	per thousand basic sum insured.....	15 cents	
D.I. in force end of year		15 cents	
Vested Annuities in force	per policy.....	$8.00 (Ord. and Group)	
Investment Expenses			
Mean Net Ledger Assets excepting		.0025	
Mortgage Loans on Real Estate		.0050	

* $1,000 taken as equivalent to $120.00 annuity.

L companies transact a substantial volume of business outside Canada and particularly in the United States. The L companies as a whole transact 27% of their new insurance in U.S. currency and have the same proportion of their insurance in force in that currency; also 30% of their liabilities are in that currency. This is shown in Table 4 and was the position at the end of 1957 according to the Report of the Superintendent of Insurance for Canada, that being the latest available for these figures.

TABLE 3

Year:	1939	1948	1952	1956	1957	1958	1959
	Average New Insurance Policy Effected*						
L Companies—Basic.....	$2,392	$3,622	$4,376	$6,154	$6,247	$6,652	$7,209
—Total.....	2,488	3,876	4,944	7,382	7,669	8,426	9,184
S Companies—Basic.....	1,829	2,574	3,269	4,428	4,737	5,073	5,358
—Total.....	1,866	2,664	3,468	4,888	5,260	5,719	6,272
	Average Annual Premium per $1,000 New Insurance*						
L Companies—Basic.....	$32.71	$33.56	$30.88	$25.73	$25.22	$24.82	$24.72
—Total.....	31.45	31.36	27.32	21.45	20.54	19.59	19.40
S Companies—Basic.....	23.37	25.15	23.89	22.37	21.64	21.29	20.84
—Total.....	22.80	24.30	22.52	20.27	19.48	18.88	17.81
	Average Annual Premium per Policy Effected*						
L Companies.....	$78	$122	$135	$158	$158	$165	$178
S Companies.....	43	65	78	99	102	108	112

* Net of reinsurances deducted—Ordinary Insurance.

TABLE 4

DISTRIBUTION OF BUSINESS BY CURRENCY OF TEN L COMPANIES

	Canadian	U.S.A.	Sterling	Other
Insurance Effected*.....	61%	27%	7%	5%
Insurance in Force*.....	62	27	6	5
Liabilities.....	57	30	9	4

* All classes.

2. *Temporary Additions to Basic Sums Insured.* A change has been made from the 1952 paper by bringing in temporary additions and term riders and applying the same allowances to them as to the basic sum insured. Prior to 1950 when these investigations began, Canadian companies varied considerably in their attitude to family income and similar benefits, and also in the bases used for reporting them in their government statements. Far greater uniformity is now apparent. Not only have these amounts increased relatively, but the introduction of the Family Plan has increased even more their relative importance.

From 1952 to 1959 these temporary additions have increased from 13% to 27% of the basic sum insured for the L companies for new business and from 7% to 16% for their in-force. For the S companies the relative increases have been 6% to 17% new, and 4% to 10% in-force. Term insurance—that is, where the basic benefit is in the form of a temporary insurance—has been taken into account in these studies from the outset.

One result of this additional expense allowance has been a flattening of the increase in the ratios of actual to expected expenses. Where expenses are a function of the sum insured, similar allowances should be granted for temporary additions and term riders as for basic sums insured. A case can be made for a slightly reduced allowance for the former compared with the latter, but it was decided the differentiation was unimportant. The change did not affect the trend of expenses. Without allowances for temporary additions the ratios of actual to expected expenses for the three years 1957, 1958 and 1959 would have been 114, 117 and 118 instead of 111, 113 and 114 for the L companies; for the S companies the ratios would have been 125, 127 and 132 instead of 123, 125 and 129. These are all according to Formula I in Tables 1 and 2.

As it might be assumed that the trends of average sums insured and premiums were affected by these temporary additions, the averages in Table 3 are given both for the basic sum insured and for the total including temporary additions and term riders.

3. *Revenue Premiums and Expenses Incurred.* This is the basis of the current Canadian federal statement which was adopted in 1954. The original studies were on the same basis. Deferred premiums less loading are deducted from the valuation reserves in the current statement.

4. *Commissions.* It was decided not to show the commissions separately in the bases in Table 2. Investigation showed that the assumed first year and renewal commissions on ordinary insurances of 50% and 3½% respectively, as in the 1952 paper, no longer applied. Commission is seldom definable to mean the same thing with different companies because of the various forms of bonuses, allowances and overridings in the marginal

field between commissions and expenses. This is another point in favor of over-all ratios.

5. *Taxes, Licenses and Fees.* The procedure has been followed of including as an expense all taxation excepting taxes on real estate and, in a stock company, taxes paid on shareholders' dividends which are charged to their fund. This was the original procedure and was continued when the 1954 government statement was introduced.

Canadian companies do business outside Canada and are subject to various taxes in the country of operation. With the ten S companies where business has been confined almost entirely to Canada, the ratio of taxes, licenses and fees to total *insurance* premiums as shown below has remained fairly constant. The major part is the provincial premium tax; annuity premiums are not taxed in Canada.

1956	1957	1958	1959
2.23%	2.29%	2.37%	2.33%

For the ten L companies the corresponding ratio has increased in recent years indicating, in large part, the increased federal taxation of life insurance in the United States.

1956	1957	1958	1959
3.23%	3.28%	3.54%	3.59%

Had the percentage of insurance premiums absorbed by taxation remained constant from 1956, the effect on the expense ratios according to Formula I would have been nominal only, 1957 remaining unchanged and 1958 and 1959 being reduced by one point, from 113 and 114 to 112 and 113 respectively. Increased taxation has hitherto been a minor item in the upward trend of expense ratios of the ten L companies.

6. *Investment Expenses.* In this investigation investment expenses are treated as a part of the general overhead of the business. In the 1952 paper the time-honored allowance was made of one-quarter of one percent of the mean net ledger assets for the year (the ledger assets are the investments plus cash). It was then acknowledged that where the proportion of real estate mortgages exceeded 20% of the ledger assets this allowance was inadequate. There has been a radical change in Canada in the increasing proportion of assets invested in real estate mortgages, as the following figures indicate:

	1939	1948	1952	1956	1957	1958	1959
L Companies...	12%	11%	20%	30%	31%	32%	33%
S Companies....	22	21	30	35	36	36	36

The "expected investment expenses" were increased in the 1954 report to the C.A.A. by an amount equal to one-quarter of one percent of the real estate mortgages. Thus, expected investment expenses are now taken as ½% for real estate mortgages and ¼% for other ledger assets. The actual investment expenses recorded by the ten L companies according to the 1957 government report were $18,998,000 or 101% of the expected by the formula. For the ten S companies the actual investment expenses recorded were 112% of the expected. A higher ratio can be justified by smaller companies, particularly where the percentage of assets invested in mortgages is above the average.

TABLE 5

EXPENSE FACTORS FOR ORDINARY INSURANCE
(INCLUDING COMMISSION AND TAXATION)

ITEM	1952 FORMULAS*				PRESENT	
	A	B	C	D	I	II
1st Year						
Per Policy	.....	$15.00	$25.00	$40.00	$25.00	$50.00
Per Thousand Sum Insured	$9.00	$10.00	$ 5.50	$ 5.50	$ 5.50	$ 5.50
Percent Rev. Prem. Inc....	65%	55%	70%	70%	70%	70%
Renewal						
Per Policy in force end of year	.....	$ 1.60	$ 5.00	$ 5.00	$ 5.00	$ 6.00
Per Thousand Sum Insured in force end of year.....	$2.00	$ 0.80	$ 0.45	$ 0.20	$ 0.45	$ 0.50
Percent Rev. Prem. Inc....	5½%	6½%	5½%	5½%	5½%	7.35%

* Applied to basic sum insured only. (These formulas are numbered 1 to 4, respectively, in the 1952 paper.)

Trend in Formulas Used—Ordinary Insurance

The various formulas for expected expenses of ordinary insurance used in these investigations are given in Table 5. Formula A is based on sums insured and premiums only and was based on one derived by a prominent Canadian company about 1937. Formula B is that published in the proceedings of the Life Office Management Association in a report of a subcommittee in 1947. Formulas C and D were devised by the author based on Canadian conditions, the $40.00 per new policy representing, in his opinion, conditions when the 1952 paper was written.

Formulas A and C were used for the reports to the C.A.A. for the years 1953 to 1959 inclusive. In December 1959 the C.A.A. decided to drop Formula A on the grounds that, being based on sums insured and premiums only, it no longer represented current loading practices and tended to obscure the real trend. The current formulas are I and II, Formula I

being the same as Formula C but applied to include temporary additions and term riders. It should be emphasized that all formulas used in the C.A.A. expense reports represent investigations and opinions of expenses under Canadian conditions. The $50.00 per policy first year in Formula II has been used by the author in calculating premium rates in Canada since 1956. Formula II when applied to the business of all twenty L and S companies combined gave 100% for the year 1958.

TREND OF BUSINESS

Trends of expenses are affected by trends in business. Table 6 compares the figures for ordinary insurance for the years 1952 and 1959. An increase of about 10% in number of new policies effected, with an increase of about 80% in new basic sums insured and a doubling of the total sums insured including temporary additions, explains the variation in size of average new policies as shown in Table 3. It illustrates the growth in recent years of temporary additions and term riders due to the introduction of family income, double protection and family plan benefits. The increase in the renewal premium income is also impressive: 42% for the L companies and 62% for the S companies.

TABLE 6

TREND—ORDINARY INSURANCE
COMPARISON, 1952 WITH 1959

ITEM	L COMPANIES			S COMPANIES		
	1952	1959	Ratio	1952	1959	Ratio
1st Year						
Number of Policies (thousands)	291	323	111%	52	57	110%
Basic Sum Insd. (millions)....	$ 1,275	$ 2,332	183	$ 168	$ 304	181
Total " " (millions)....	$ 1,441	$ 2,971	206	$ 179	$ 356	199
Prem. Income (thousands)....	$ 39,367	$ 57,636	146	$ 4,022	$ 6,343	158
Renewal						
Number of Policies (thousands)	3,812	4,461	117	545	681	125
Total Sum Insd. (millions)....	$ 12,155	$ 21,200	174	$ 1,302	$ 2,365	182
Prem. Income (thousands)....	$315,496	$446,962	142	$27,985	$45,442	162

The number of new policies effected for ordinary insurance has shown no tendency to increase in the last few years, as the following figures indicate:

	L Companies	S Companies
1959	323,466	56,797
1958	336,022	58,407
1957	336,753	58,431

In a country with an expanding population this should be cause for concern. Increasing competition to maintain sales may be a factor in future expense trends.

RELATION OF PRICES TO AVERAGE POLICY

The Consumer Price Index in Canada has doubled from 1939 to 1959 (63.2 to 126.5, 1949 = 100). With an increase in average new insurance to three times the figure for basic insurance and even more when temporary additions and term riders are included, it may be said that the life insurance industry in Canada has played its part in providing protection far exceeding the inflation of the past twenty years. In the period 1952 to 1959 this is even more so.

Table 7 illustrates the foregoing. From 1952 to 1959 retail prices have increased by 9%, whereas basic new sums insured per policy have in-

TABLE 7

COMPARISON BETWEEN AVERAGE ORDINARY POLICY EFFECTED AND CANADIAN CONSUMER PRICE INDEX—1952 = 100

Year:	1939	1948	1952	1956	1957	1958	1959
	Average New Insurance Policy						
L Companies—Basic	55	83	*100*	141	143	152	165
—Total	50	78	*100*	149	155	170	186
S Companies—Basic	56	79	*100*	135	145	155	164
—Total	54	77	*100*	141	152	165	181
	Average Annual Premium per $1,000 New Insurance						
L Companies—Total	115	115	*100*	79	75	72	71
S Companies—Total	101	108	*100*	90	87	84	79
	Average Annual Premium per Policy Effected						
L Companies	58	90	*100*	117	117	122	132
S Companies	55	83	*100*	127	131	138	144
	Price Indexes						
Consumers (Retail)	54	83	*100*	101	105	107	109
Wholesale	44	86	*100*	100	101	101	102

creased by 65% for the L companies and 64% for the S companies. Including temporary additions and term riders, the increases have been 86% and 81% respectively. Average premiums per policy have increased by 32% for the L companies and 44% for the S companies over the same period. The wholesale price index is shown as indicating possible difficulties for Canadian life insurance expense trends in the future.

Declining Rate of Premium

The striking reduction in average premium per thousand new ordinary insurance from 1952 to 1959 merits some comment (see Tables 3 and 7). So far as it is due to increasing sales of temporary additions and term riders to basic permanent plans of insurance, the author commends the trend, for only by this means can voluntary insurance plans give adequate protection to compare with government social security projects.[3] Should it be partly due to an increasing volume of basic term plans written at severe competitive rates, the influence on expense trends is important and hence this reference to it. The same problem was met and referred to fifty years ago in a classic paper on life office expenses in the United Kingdom.[4] Referring to term insurances, H. J. Rietschel, F. I. A., wrote:

> The only way to regard these assurances is that they are supplemental to the general business of the office and assist to bear such a proportion of the initial expenses as competition will allow.

Where such "supplemental" business amounts to 25 or 30 percent of the total ordinary insurances written, a serious expense problem arises; this is the case with some companies in Canada.

A recent development which has affected expense trends and is likely to affect them in the future is the increasing popularity of decreasing term insurances. These are basic plans where the benefit is of the form $\bar{a}_{\overline{n}|} - \bar{a}_{x:\overline{n}|}$ with a level annual premium. The average rate of premium per thousand initial sum at risk on such plans is substantially lower than on regular short term insurances whether renewable or convertible. The expense loading in these decreasing term insurances is necessarily on a lower scale than on permanent plans of insurance. The same may be said for regular short term insurances. As the proportion of business sold on these basic term plans increases, the method used in this paper for determining expense trends requires modification. A uniform expense factor such as $50 per policy plus allowances based on sums insured and pre-

[3] Pedoe, Arthur: "The Family Income Plan," *RAIA* XXX, 76 (1941), particularly author's reply to the discussion.

[4] Rietschel, H. J.: "Analysis and Apportionment of the Expenses of Management of a Life Office," *JIA* XLIV, 415 (1910).

miums, when applied to new business including a substantial proportion of the types of term insurances described, must give total "expected expenses" for such business on the high side. As a result the ratio of actual to expected expenses is lowered. The increasing proportion of such business sold in recent years means that the upward trend of expenses in Canada is in reality greater than indicated in Table 1. An unusual period of prosperity such as has been enjoyed by life insurance companies in recent years may obscure the financial effects of the trends indicated. The question of the trend toward lower premium rates for term plans in relation to increasing cost trends is beyond the scope of the paper.

TREND OF EXPENSES

This paper has established the upward trend of life insurance expense ratios in Canada. The author considers that further analysis is a matter for individual companies which consider their over-all rates out of line with companies of their class. That one company on a certain basis shows a lower expense ratio than another does not indicate positively that the first company is operating more efficiently than the other. Expenses must be judged in relation to loadings and surplus earning power. The subject is fraught with difficulties and lends itself readily to self-deception where any particular company is concerned. The question of regulation introduces even more difficulties. A worth-while discussion on this point took place in November 1952 at a Society meeting[5] and the record should be required reading for all members.

Where costs throughout the economy are increasing, it is only to be expected that the life insurance industry would be similarly affected. It has to compete with other businesses for staff and services. In recent years staff amenities such as pension plans, cafeteria services, etc., have played a prominent part in the relations of business with its employees, and it would be unreasonable to expect the life insurance industry to have escaped these additional costs. The funding of their staff pension plans has received considerable attention among Canadian life insurance companies in recent years and has undoubtedly contributed to the upward trend in costs.

GROUP EXPENSES

The effect of the formulas for expected expenses used for group insurances and group annuities in the C.A.A. studies has been considered on various occasions—in particular the possibility of those formulas distorting the over-all results. From Table 8 it is apparent that group expenses are still a relatively minor although increasing part of the expense picture.

[5] *TSA* IV. 807–824.

The growth of premium income of group business of the ten L companies is shown in Table 9. From Table 8 it is apparent that no purpose would be served in investigating the group business of the S companies. Further, as one of the L companies had been a pioneer in group business and the magnitude of its business relative to the other nine would influence the results unduly, it was decided to confine the expense investigation to nine L companies only.

Difficulties of Allocation of Expenses in Group Business

The difficulty of deciding what are first year costs is greater in group than in ordinary business. Substantial amounts of what are in effect new premiums are not recorded as such. This business may be due to bringing

TABLE 8

EXPECTED EXPENSES: TOTAL VERSUS GROUP
(Amounts in Thousands)

	Year	Total Expenses*	Group Insurances	Group Annuities	Ratio Group to Total
L Companies.....	1952	$128,717	$ 4,292	$3,224	5.84%
	1959	191,854	11,150	7,728	9.84
S Companies.....	1952	$ 13,734	$ 42	$ 24	0.48%
	1959	21,050	251	570	3.90

*Formula II.

TABLE 9

GROUP PREMIUM INCOME OF TEN L COMPANIES
(Amounts in Thousands)

	GROUP INSURANCES			GROUP ANNUITIES		
	1st Year	Renewal	Single	1st Year	Renewal	Single
1939.....	$ 303	$ 8,161	$ 0	$ 761	$ 3,131	$ 433
1948.....	1,109	16,266	33	1,686	16,915	3,646
1952.....	3,069	26,038	262	3,808	37,114	5,457
1955.....	4,908	38,694	354	6,761	54,657	6,741
1956.....	4,682	45,299	324	6,744	62,175	4,164
1957.....	7,147	51,319	357	7,012	75,600	4,321
1958.....	6,374	56,898	1,328	7,413	83,105	10,120
1959.....	8,699	62,656	1,133	6,095	89,722	28,675

in new classes under an existing group. Further, group field forces are largely remunerated by salary and their duties in servicing existing business are not readily separated from acquisition costs. This is one reason why in some of the formulas used the allowances for first year business are restricted, with the balance being charged against renewal business.

Group insurances and group annuities include a wide variety of plans. At one extreme they may differ little from ordinary insurances and annuities. At the other extreme they introduce entirely new conceptions which may seem to challenge the accepted principles of the business. One example is under group annuities where a plan may be, in effect, the deposit of substantial amounts for investment with guaranteed settlement options.

It may appear from this that any attempt to trace the trend of group expenses is doomed to failure. However, when the results were completed they indicated a pattern which seemed worth recording. The total absence of any published figures in this connection must be disconcerting, particularly to the student. By giving the result by a number of formulas it is hoped that investigation will be encouraged by individual companies.

GROUP LIFE INSURANCE

In Table 10 seven formulas for group life insurance expenses are outlined and the results given when applied to the nine L companies combined. The volume of group insurances in force of these nine companies was 63%, and that of the tenth company omitted 37%, of the total. The details of the application of Group Formula No. 7 are given in the lower half of Table 10 so that the results of any variation of the formulas can be determined.

Group Formula No. 1 is that used in the C.A.A. studies as shown in Table 2. The renewal allowance there applies to the gross group insurance revenue premium income. When including participating with nonparticipating business the premiums less dividends, or the "net" premiums, should be considered and in Group Formulas Nos. 2 to 7 allowances are applied to the net premiums. The three periods taken are the average of the three years 1955, 1956 and 1957; the year 1958; and the year 1959.

Credit group insurance forms a large part of the group insurance certificates in force in Canada (over 30%). In credit group business no records of individual amounts or lives insured are kept by the insurance company. No expense allowance is made for credit group insurance on a per certificate basis in the investigation represented by Table 10.

The variations from Group Formula No. 1 may be noted. The first

year allowances are reduced in No. 2 and No. 3 to what may be the balance after paying first year claims. In No. 4 this is further reduced to possible taxation and commissions only. Formula No. 6 gives a ratio of actual to expected of approximately 100% for each period investigated. In examining the results by the different group insurance formulas it should be noted that 1959 new group insurance business for the nine L

TABLE 10

GROUP LIFE INSURANCE
EXPENSE FACTOR FORMULAS

Item	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
1st Year: Per Pol.	.....	.....	.....	.....	$ 200	$ 200	$ 400
" " Per Cert.	.....	.....	.....	.....	.....	.....	$1.40
" " Premium	55%	45%	45%	20%	35%	15%	12%
Renewal: Per Pol.	.....	.....	$ 75	$ 160	$ 135	$ 125	$ 100
" " Per Cert.	.....	.....	$0.50	$0.65	$0.50	$0.30	$0.70
" " Gross Prem.	10%	.....	.....	.....	.....	.....	.....
" " Net Prem.	.....	12½%	6%	6½%	4¼%	10%	5%
Single Premium	5%	5%	5%	5%	5%	5%	5%
	Ratios Actual to Expected Expenses						
1955–1957 Combined	106.5%	105.5%	101.6%	97.7%	101.5%	100.1%	99.4%
1958	108.5	106.4	103.8	99.8	103.5	101.0	104.6
1959	100.6	100.8	99.0	100.2	99.8	99.8	99.0

EXPECTED EXPENSES
FORMULA NO. 7—AMOUNTS IN THOUSANDS

Year:	Average 1955–1957	1958	1959
1st Year: Per Pol. $ 400	$ 504	$ 710	$ 934
" " Per Cert. $1.40	309	201	614
" " Premium 12%	389	505	746
Renewal: Per Pol. $ 100	702	919	1,068
" " Per Cert. $0.70	1,281	1,654	1,894
" " Net Prem. 5%	992	1,339	1,559
Single Premium 5%	8	9	11
Total	$4,185	$5,337	$6,826
Actual Expenses	$4,161	$5,584	$6,760
Ratio Actual/Expected	99.4%	104.6%	99.0%

NOTE.—No Allowance per Certificate for Credit Group Business.

companies indicated a sharp increase above that for 1958. The increases were 32% in number of policies, over 200% in number of certificates and almost 50% in new annual premium income.

Trend in Group Insurance Expense Rates

Wide fluctuations are to be expected in new group business. Hence it is difficult to determine trends in expense rates except after the lapse of a period when the results may be of theoretical interest only. There is no doubt of the expense ratio for 1958 being above that for the period of three years 1955, 1956 and 1957 combined. The result for 1959 is affected by the large new business for that year and the trend from 1958 will be clearer when the results for 1960 appear. In view of the increasing competition for group insurance business, both in sales pressure and in rate of premium, the trend of expense ratios is of major importance.

GROUP ANNUITIES

Table 11 gives the results of applying seven expected expense formulas to the group annuity business of the nine L companies. The details are given for Formula (vii) so that the results of any modification can be determined. These nine companies had a renewal premium income under group annuities of $53 millions at the end of 1959, which was 60% of that of the ten companies; they had two-thirds of the certificates in force. It should be noted that 1958 was an abnormal year for new group annuity business relative to 1959. The first year premium income for 1958 was 17% greater and the number of new certificates 49% greater than in the following year.

Single Premium Expense Modification

The large amounts of single premium received in 1958 and 1959 introduce a problem. It is possible that this trend may continue. For the nine L companies investigated, the single premium group annuity income for the three year period 1955–57 averaged $3.9 millions; for 1958 it was $9.2 millions and for 1959 it was $22.5 millions. The expected expense allowance of 3% was adopted when single premiums were relatively unimportant. The taking over, say, of a self-insured pension plan on lives who may be already covered involves entirely different expense considerations. The suggestion is made that the allowance for *each* company be reduced progressively as follows:

First million dollars, allow 3%
Second million dollars, allow 2%
Third million dollars, allow 1¼%

and so on: fourth million, 5/8%; fifth to ninth million, 5/16% and for the tenth million on, 5/32%.

The use of this modified formula would reduce the allowances compared with the 3% allowed in Tables 1 and 2 by $406,739 for 1959, $48,531 for 1958, and on the average $16,883 in each of the years 1955, 1956 and 1957. These amounts, although of some importance in group annuity

TABLE 11

GROUP ANNUITIES
EXPENSE FACTOR FORMULAS

Item	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
1st Year: Per Pol.	.....	.....	.....	.....	$ 150	$ 650	$1,000
" " Per Cert.	.....	.....	.....	.....	.....	$3.00	$25.00
" " Premium	17%	17%	20%	24%	5%	20%	10%
In Force: Per Pol.	.....	.....	.....	.....	$ 500	$ 150	$ 150
" " Per Cert.	.....	.....	.....	.....	$4.00	$3.00	$ 3.00
Renewal: Gross Prem.	6½%	.....	.....	.....	.....	.....	.....
" " Net Prem.	.....	6½%	6%	5½%	2%	2½%	2½%
Single Premium	3% Adj.	3% Adj.	3% Adj.	3% Adj.	3% Adj.	3% Adj.	3% Adj.
	Ratios Actual to Expected Expenses						
1955–1957 Combined	97.2%	97.9%	98.4%	100.0%	100.2%	97.4%	99.2%
1958	93.5	94.2	94.8	96.4	95.1	94.4	93.4
1959	96.5	97.4	99.3	103.1	96.2	102.6	103.4

EXPECTED EXPENSES
FORMULA (vii)—AMOUNTS IN THOUSANDS

Year:	Average 1955–57	1958	1959
1st Year: Per Pol. $1,000	$ 493	$ 543	$ 521
" " Per Cert. $25	323	603	406
" " Premium 10%	515	673	573
In Force: Per Pol. $150	424	577	646
" " Per Cert. $3.00	444	605	661
Renewal: Net Prem. 2½%	854	1,136	1,315
Single Premium 3% Adjusted	100	226	269
Total Expected	$3,153	$4,363	$4,391
Actual Expenses	$3,130	$4,073	$4,541
Ratio Actual/Expected	99.2%	93.4%	103.4%

expense trends, would be of minor importance in the over-all ratios. If similar adjustments were made to the ratios for the ten L companies in Table 1 they would increase them for Formula I by 0.27 of a point and for Formula II by 0.35 of a point for 1959, with negligible increases in prior years.

Group Annuity Formulas Used

Of the seven formulas given, not more than three can be said to be based on actual investigation, but all seven are based on suggestions by actuaries of contributing companies, duly modified where necessary to apply to the combined business of several companies. That actuarial opinion is vague and varied on this subject is acknowledged.

Formula (i) is the current C.A.A. formula with the modified formula for single premiums. The renewal premium factor was applied to "net" premiums for the other formulas. As the 17% applied to first year group annuity premiums in (i) was considered inadequate by some critics, this was increased to 20% in Formula (iii) and 24% in (iv), with renewal premiums adjusted accordingly. In Formula (v) the first year commissions are assumed to be on a relatively low scale, with the balance of first year costs charged to renewals and business in force. It should be understood that when the charge is per policy or per certificate, it is an average charge and often varies with the size of the case, larger amounts for larger cases and vice versa.

Cost of Quotations and Changes

It is not intended to discuss here whether all acquisition costs should be charged against first year premium income. The cost of quoting for pension business is substantial and the practice of prospective purchasers or their advisers requesting numerous quotations indiscriminately and from many insurers is a serious cost problem. There is also the equally serious problem of making quotations on existing policies where employers are considering changes. The two problems are combined when a change in insurer is contemplated.

If we consider year 1959 and Formula (vii), the expected first year cost is $1,500,000. Excluding taxation (0.52% premiums) the cost is $1,470,207. The nine L companies effected 521 new policies in that year, so that first year costs averaged $2,822 a case. Considering the highly technical services involved, this cost of establishing an employees' pension plan is not high.

Trend of Expense Ratios for Group Annuities

Omitting 1958 as an abnormal year, the trend of expenses from the period 1955, 1956, 1957 to 1959 depends on the apportionment of first year expenses. Where it is on the low side and possibly inadequate, the trend is *down*, as in Formulas (i), (ii) and (v). Where it is attempted to apportion first year costs on a functional basis and possibly overcharge them, the trend is *upwards*, as in Formulas (iii), (iv), (vi) and (vii).

The figures given in Table 11 do not include the group annuity business of two prominent Canadian companies. It is only fair to state that had they been included the ratios in Table 11 of actual to expected expenses would have been reduced.

Credit should be given to Mr. Archie R. McCracken, who joined the Committee (of one) and shared the responsibility and work for the year 1959 which included the decision on the new basis, Formula II. Mr. McCracken has now taken over this work under the auspices of the Canadian Association of Actuaries.

DISCUSSION OF PRECEDING PAPER

A. R. MCCRACKEN:

Mr. Pedoe has been kind enough to mention that I have taken over his former duties in connection with the expense investigation work of the Canadian Association of Actuaries. After reading this paper I now realize, even more fully than before, the amount of thought which Mr. Pedoe has put into the study of life insurance company expenses.

Almost every reader of the paper will have changes to suggest in some of the formulas used for expected expenses. However, I think most will agree that the methods which Mr. Pedoe has used do produce worth-while results. In addition, the various formulas suggested provide valuable bases from which individual actuaries may develop modifications as required for their own studies.

My specific comments relate to the latter part of the paper, Group Expenses.

Group data may exhibit a marked lack of homogeneity. Mr. Pedoe has indicated that no expected expense per certificate has been allowed for Credit Group Business. A similar treatment should probably be accorded other Group Life business that is on a so-called "self-administered" basis. Certain Deposit Administration plans are also in the class where the number of certificates is of little or no consequence. However, for other Deposit Administration plans the insurance company may be keeping the records in respect of individual members and may be providing actuarial services, so that the number of certificates may be just as significant as under a conventional Group Annuity contract.

In the opposite direction some companies have large volumes of Association Group business. Here the methods of sale and administration may be such that the added expenses for each certificate may be completely out of line with per certificate expenses of a normal employer-employee group.

Group cases that are shared or reinsured may require the use of a certificate count differing from that appearing in a company's annual statement.

Mr. Pedoe has referred to the costs of making quotations for Group business. In the Ordinary area some quotations lead to sales and others do not. However, each individual quotation generally relates to a small portion of the year's potential new business. In the Group field the success

or failure of a few large case quotations can have a tremendous effect on the year's operations. Because we are dealing with larger units, new business necessarily fluctuates to a much greater extent from year to year. In a year when sales are low we have probably been making just as many quotations, and have incurred many of the expenses that would have been incurred if a number of unclosed cases had been closed.

A formula relating to new business and business in force does not reflect the costs of the unclosed business, so that my guess is that regardless of formula used we are likely to find a lower expense ratio indicated in a year when sales are high and a higher expense ratio indicated in a year when sales are low. This effect can be recognized in the relatively high ratios shown in the paper for Group Life in 1958 and for Group Annuity in 1959.

J. S. HILL:

We are grateful to the author for providing us with additional information and a renewed stimulus for attacking the challenging and sometimes baffling problem of expense comparisons. Some applications and extensions of his approach which have been used in our company may be of general interest.

Application of the new Formula II to ten medium sized companies for 1959 gave ratios ranging from 75% to 140%, but centering around 100%. The extremes raised doubts as to the validity of the formula, but further studies confirmed the fact that expense levels do in fact vary widely. Other studies demonstrated that there is no significant correlation between the expense ratios obtained and rate of growth; nor was there any relationship between expense ratios and average premium levels. Still further studies showed good correlation between the Pedoe ratios and the ratios of total expenses to total expense limits taken from Schedule Q.

Having satisfied ourselves that the differences were genuine, we then undertook to assess the principal reasons for the differences. From our own expense analyses we had already developed "expected expense" factors which would reproduce fairly well most of the items in Exhibit 5 of the Convention statement. To obtain the expected amount of each item, unique factors for that item were applied to one or more of six items, as follows:

Number of New Ordinary Policies Paid For
Amount of Ordinary Insurance Paid For
First Year Premiums Paid (Ordinary)
Number of Ordinary Policies in Force
Amount of Ordinary Insurance in Force
Renewal Premiums Paid (Ordinary)

It will be seen that only ordinary insurance is dealt with; and the comparisons had to be made either with companies which had no group insurance or with companies for which a separation of group expenses was obtainable.

The use of these expected expenses for intercompany comparisons was as follows:

1. For any desired Exhibit 5 item, work the expected expense for Company A.
2. Work the corresponding expected expense for Company B.
3. Multiply Company B's actual expense by the ratio of item 1 to item 2. The result is the expense Company A would have had if it had operated with the same expense level as Company B. Conversely the result may be stated as the expense Company B would have had if it were precisely Company A's size.

Viewed either way, the result is compared with Company A's actual expense for each item and the items with significant differences are noted. At this point it is essential for Companies A and B to work closely together for at least two reasons:

1. What appear to be significant differences may be only differences in classification.
2. The explanation of real differences cannot be found in the pages of the annual statement.

In our study we selected three other companies for detailed study and spent a day in the home office of each of them. The insights so gained have been valuable in subsequent expense work being done in our own company. These insights might be divided into three classes:

1. Bookkeeping differences. These include differences in classification and certain other items, such as home office rent.
2. Differences due to local conditions. These would include effect of local employment market and salary levels, and such things as large amounts of foreign business, branch office versus general agency operations, etc.
3. Differences due to different management emphasis.

It is this third category that represents the real gold. They form the basis for further analysis of company operations to determine the relative wisdom of change as against a continuation of present policy—which brings us close to our real purpose in expense analysis and comparison.

larger companies where the average size of investment will be much greater than in the case of smaller companies.

We are again indebted to Mr. Pedoe for a splendid piece of work.

E. J. MOORHEAD:

Inspired by the trail blazing that Mr. Pedoe has done, we, for the past several years, have been using the same kind of formula approach in an attempt to compare our own expenses with those of seven other mutual, general agency companies, all operating in New York. Our formula, which approximately reproduces the expenses of my own company for 1955, is given in the following table in a form comparable to Mr. Pedoe's Table 2.

ORDINARY INSURANCE (Reinsurance Not Deducted)		
1st Year		
Number of Policies paid for	per policy.....	$38.00
Sum Insured	per thousand.....	$ 9.00
Revenue Premium Income	percent.....	Note 1
Renewal Premium Paying		
Number of Policies in force end of year less paid-for	per policy.....	$ 3.50
Sum Insured in force end of year less paid-for	per thousand.....	$ .30
Revenue Premium Income, Pol. Years 2–11	percent.....	7.25%
Revenue Premium Income, Pol. Years 12 & on	percent.....	2%
Renewal Paid-up		
Number of Policies in force end of year	per policy.....	$ 1.00
ORDINARY ANNUITIES		
1st Year		
Number of Policies paid for	per policy.....	$24.50
Sum Insured*	per thousand.....	$ 6.60
Revenue Premium Income	percent.....	15%
Renewal		
Number of Policies in force end of year less paid-for	per policy.....	$ 3.25
Sum Insured* in force end of year less paid-for	per thousand.....	$ .18
Revenue Premium Income	percent.....	4%
SINGLE PREMIUM BUSINESS		
Single Ordinary Insurance Premiums	percent.....	3%
Single Ordinary Annuity Premiums	percent.....	2½%
DISABILITY AND ACCIDENTAL DEATH BENEFITS.....		Note 2
INVESTMENT		
Investment Expense	Total assets end of year.....	.0024

* $1,000 taken as equivalent to $120.00 annually.

NOTE 1.—Percentage developed in Item 25 of Schedule Q and applied in Item 26 of Schedule Q to first year's premiums on new insurance (defined in New York Section 213, Subsection 3(a)).

NOTE 2.—A proportionate part of the "per thousand" and "per policy" expected expenses corresponding to the ratio of Disability and Accidental Death Benefit premiums to insurance and annuity premiums.

While there is obviously a strong family resemblance between this formula and the author's, there are several significant differences which may be summarized as follows:

CHARLES F. B. RICHARDSON:

We are greatly indebted to Mr. Pedoe for his masterly review of the trend of expenses in Canadian companies derived from the studies he has been making for a long period of years. He has covered the subject so completely that it is difficult to make any useful comments. There are only a few points which I would like to make.

1. The ratios given in Table 1 for the two groups of companies are presumably derived from the totals of the actual and expected expenses for the companies in each group. If this is so, a particularly large company will obviously have an important bearing on the final ratio. It would be extremely interesting to know what is the range of these ratios as between the highest and the lowest company in each group. While a formula of this kind may perhaps work quite well for a majority of the companies, it may not work at all well for an individual company with a different type of operation, a different rate of growth, or some other unusual characteristic. This is so obvious I almost hesitate to mention it, but it is an important aspect of this type of analysis.

2. As to the expense factors themselves, which are obviously the result of experiments, it is rather difficult to make comments on specific items. However, the first year rate of $50 per policy in formula 2 does appear rather high, and the factors used for group insurance and group annuity also appear distinctly high unless relatively small average sized groups are involved. Certainly if these are the rates of expense being experienced, some of the retention quotations I have seen in the recent past are surprising, to say the least. It is obvious that the rate of expense on group operations will vary widely between companies according to the average size of group; and this is perhaps the area where an approach of this kind is debatable, particularly in the case of a company having a proportionately large amount of group business.

3. In the case of temporary additions to the basic sum insured, it is not entirely clear whether the expected expenses are based only on the per thousand item or whether they also include the percentage of premium items. Judging by the rates being charged for these additions by some companies, based on the philosophy that the principal policy carries the main expense, it is doubtful whether these additions can stand as high a rate of expense as has been assumed. Presumably the term insurance arising from the one year term dividend option is not included in this category.

4. In the case of investment expenses, I would suspect that a rate of $\frac{1}{4}$ of one percent for securities is likely to be excessive, particularly for the

do not yet know whether the drop in 1960 has any real significance, but we hope it reflects improvement in the over-all situation as a result of rather severe cost control programs instituted within the last few years.

Year	Ratio Actual to Expected
1952	88%
1957	97
1958	106
1959	115
1960	107

United Benefit, together with Mutual Benefit Health and Accident Association, has a very fine system for the allocation of expenses between the companies, as well as for the allocation of expenses for management purposes. In many respects, the only thing constant in this world is change and the same applies to this allocation system. As mentioned previously, major changes can be eliminated or compensated for in the expense analysis, but many of the smaller changes brought about by the introduction of the IBM 705 machine are difficult to isolate and eliminate or compensate for. If something other than an over-all basis is used, then it is possible for these smaller changes to affect the results adversely.

Mr. Pedoe's paper is based on the current Canadian Federal statement which was adopted in 1954. Recognizing that there are differences in practices between Canadian and United States companies, particularly in regard to the annual statements, it is still possible to utilize a formula similar to that outlined by Mr. Pedoe; and if it is consistently applied, meaningful results will be obtained. The one item that is not available in the annual statement for United States companies is the amount of total and permanent disability insurance in force at the end of the year to which the factor of 15¢ per thousand of the basic sum insured is applied.

It would have been interesting if the range of percentages—that is, the highest and lowest percentage for an individual company for a particular year—had been incorporated, since fluctuations will exist in the figures for a particular company.

WILLIAM O. BURNS:

Mr. Pedoe should be complimented on his contribution to the Society of Actuaries concerning expense trends. My company has made and will make use of his approach to expense analysis. There are, however, a few remarks that I would make on his current article. Concerning his paper presented in 1952 the question arose as to what was actually meant in his formula by renewal policies and insurance in force. In scanning the

discussion by Mr. Pedoe in the 1952 *Transactions*, that question did not appear to have received an answer. As a result, I ask the question again: "When Mr. Pedoe refers, under the heading '*Renewal*,' to number of policies in force and sum insured in force at the end of the year, is he referring to the total policies and total insurance in force at the end of the year, or is he referring to the total policies and insurance in force less the new issues for the year?" Actually, as his formula appears one would assume he refers to actual renewal policies and amount in force, but this figure is not obtainable from an annual statement as such, so apparently this is not what he meant.

One of Mr. Pedoe's comments in his rebuttal to discussion in 1952 was that no one had discussed the actual trend of expenses, which he explained was one of the main purposes of his article. I will say, using his formulas I and II as defined in his current paper, that expenses do appear to be on the rise, although this might be misleading in some instances. For example, we all know that many companies are converting to electronic data processing and that, during the period of conversion, expenses of the company are going to be increased. In my own company this is true, and I assume I could make proper adjustments to total expense figures to bring total expenses from year to year to a comparable basis. However, I want to point out that, as I understand it, one of Mr. Pedoe's purposes in presenting this paper is to allow companies to compare themselves with other companies in relation to expenses, and I would assume in most cases it would be impossible for one company to make adjustments to another company's annual statement expense figures for something like electronic conversion. Briefly, my point is that you can use the comparison between companies but the results could be very misleading if one company has had an extraordinary expense in one particular year.

Since it has been predicted that for 1959 the United States Federal Income Tax on life insurance companies will amount to about $480 million and since it has been estimated that approximately only $20 million of that will be from Phase II, it would appear that U.S. companies should modify, or perhaps Mr. Pedoe should modify, his expected formula to include some percentage of assets or other applicable figure for income tax purposes. I am thinking of something similar to his method of obtaining expected expense for investment expenses.

(AUTHOR'S REVIEW OF DISCUSSION)

ARTHUR PEDOE:

When I presented the first paper in 1952 there appeared to be some hesitation whether the subject of expenses was a suitable one for the So-

1. Our yardstick measures only expenses of Ordinary insurance and annuity business. Expenses of Group and Accident and Health business that are eliminated are the expenses for these lines shown by the companies in their Annual Statements.
2. Our formula relates to commissions and general expenses, but not to taxes.
3. We use a separate factor for paid-up policies. We relate our renewal expense to the business in force at the end of the year *less* the new business of the year.
4. Since all the companies involved complete Schedule Q, we are able to allow for commission differences arising from different distributions of new business by plan of insurance. Instead of using a flat percentage of first year premiums, our expense factor uses the actual Schedule Q percentage computed by each company. This is not a very important point as the total spread between companies in 1960 for this factor was only the distance between 49.2% and 51.4%.
5. In allowing for renewal commissions we make an approximate separation between business at policy durations 2–11 and business at higher policy durations, applying a separate factor to each of these.

The aggregate ratios of actual to expected expenses for the New England Mutual Life and for the eight companies combined have been as follows for the year 1951 and for the years 1955–1960 inclusive.

RATIOS OF ACTUAL TO EXPECTED EXPENSES

	YEAR						
	1951	1955	1956	1957	1958	1959	1960
All 8 Companies.....	95%*	102%	103%	106%	107%	106%	111%
New England Mutual Life	93	100	101	106	109	110	111

* 7 companies.

Criticisms by actuaries of the seven other companies that have involuntarily been included in this study suggest various ways in which the formula might be improved so as to reflect the situation more adequately without making it too complicated and without going beyond information that is obtainable in the Annual Statement, including New York's Schedule Q. In particular, this formula is weaker than necessary and less adequate than Mr. Pedoe's formula in the treatment of investment expenses for different types of asset. Also, it has been pointed out that the recent actions of some companies in issuing substantial blocks of business

on a reduced first year commission and increased renewal commission scale distort the result unless an adjustment is made.

Our conclusion over the period of years since we have been using our version of Mr. Pedoe's method has been that it does give a useful insight into the comparative expenses picture which, as far as we know, is not available in any other way. But it is necessary to use due care and intelligence, to avoid assuming that the formula will safely display minor differences in expense levels, to be on the alert for special and unusual causes of distortion, and to be prepared to revalidate and, if necessary, change the individual factors from time to time.

Mr. Pedoe has done us all a great service, both in his research itself and also in the missionary work that he has effectively undertaken. I am happy to observe that those who have discussed this paper seem to agree that he has developed a valuable procedure.

MYLES M. GRAY:

Other members have expressed their gratitude for another contribution by Mr. Pedoe to the *Transactions*. I wish to concur in those expressions of gratitude and also say that Mr. Pedoe has attacked directly the problem that many of us have purposely avoided. How many times have we failed to see the forest because we are continually looking at the trees? How many times have we failed to note trends in company expenses over-all because we are concerned with the trends of many individual items? I hope that Mr. Pedoe's paper has broken the ice, so to speak, so that we will see more papers in the *Transactions* in the future on this very important subject of expenses and their trends.

The statement is made that "for an expense ratio to mean anything there must be a basis for comparison with other companies operating in the same field." Just as companies differ in their operations for a particular year, a particular company will differ over the years. Obvious inconsistencies from year to year must be eliminated if a method is to be used for comparing expenses from year to year to establish trends. The obvious inconsistencies are usually quite simple to eliminate, but small and individually insignificant inconsistencies are hard to eliminate and are a possible trouble spot in expense analysis.

At United Benefit, we have made detailed expense analyses since 1952, but though information is available for each year, it is difficult to establish trends unless a method similar to that outlined by Mr. Pedoe is used to establish some expense index. Earl Magnuson, of our office, has calculated ratios of actual to expected expenses for our company using Mr. Pedoe's formula II. The results may be summarized as shown below. We

ciety. It is now clear from the discussion on the present paper that interest has been awakened in recent years, not only in Canada but also in the United States, to the importance of the matter. The figures given by Messrs. Moorhead and Gray are particularly welcome.

Mr. A. R. McCracken, on behalf of the Canadian Association of Actuaries, has published the results for 1960 and the trend of every figure and ratio from 1958 to 1959 is continued to 1960. In particular, dealing with ratio of actual to expected expenses and the figures being those for 1958, 1959, and 1960, respectively, the ratios by Formula A1 are, for the L companies, 113%, 114%, and 115%; for the S companies, 125%, 129%, and 133%. For Formula C the figures for the L companies are 99%, 101%, and 102%; for the S companies, 106%, 109%, and 114%. Cost trends evidently continue upwards.

The difficulties of deciding on a formula for group expenses are emphasized by Mr. McCracken. In the paper the volume of group business was shown to be still small relatively to ordinary business, but the proportion is increasing and so this problem will increase in importance. Future investigations may have to be based on the assumption of different formulas for group business, to see whether the cost of the latter is affecting the trend of expense ratios for ordinary business.

Mr. Hill refers to the variation of expense ratios among U.S. companies to which he has applied the formulas of the paper. I would mention that the variation among the twenty Canadian companies contributing to the investigation is also quite substantial. One must emphasize that the sole fact that one company, on the bases shown in the paper, has an expense ratio lower than another does not necessarily mean that the first company is administered better than the other. A case in point is where the first company writes a large proportion of business on term rates which are unduly low relative to the loadings assumed by the expense formulas. However, where companies do a similar type of business and operate in similar areas, undoubtedly the lower the expense ratio the better is the company doing its job.

The point is made by Mr. C. F. B. Richardson that $\frac{1}{4}\%$ for investment expenses favors the larger companies. I agree. Regarding temporary additions to the basic sum insured, the premiums used are the total inclusive premiums as shown in the Canadian Government Statement. The one year term dividend option is ignored in the bases used; it is a negligible factor with Canadian companies.

May I advise Mr. Myles Gray not to worry about eliminating "small and individually insignificant inconsistencies." The real value of the method outlined in the paper is: (1) it is based on figures given in the Gov-

ernment Statement; (2) once a formula has been decided upon, the results are free from manipulation; (3) it is simple in operation, comparable line by line with results from previous years and hence errors can be readily noted.

Mr. Moorhead's discussion is a valuable addition to the paper—particularly his study of eight U.S. companies, showing the figures of his own company in comparison. His statement confirms what I have tried to emphasize in both papers: "It is necessary to use due care and intelligence . . . to be on the alert for special and unusual causes of distortion and to be prepared to revalidate and, if necessary, change the individual factors from time to time."

To answer Mr. Burns, the number of policies and the sum insured in force at the end of the year, for use in connection with renewal expenses, as shown under the heading "*Renewal*" are the total number in force and total sum insured and not, as in Mr. Moorhead's formula, the number and amount in force less the new issues. This method results in a simpler calculation and yet produces the same result as if the other method were used and the first year expense factor were a total first year expense factor rather than an excess factor. As for Mr. Burns' other remarks, I would quote from the paper: "The subject is fraught with difficulties and lends itself readily to self-deception where any particular company is concerned."