**TRANSACTIONS OF SOCIETY OF ACTUARIES**
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# SOME REFLECTIONS ON FUND ACCOUNTS

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## INTRODUCTION

ACTUARIAL literature does not contain many references to fund accounts. To a life insurance company which writes more than one line of business, fund accounts can be of considerable value when properly interpreted, and the purpose of this paper is to discuss the fundamentals of such accounts in relation to effective company administration. With the exception of investment income and certain assets and liabilities, there will be no discussion of methods of allocating various accounting items to the several lines of business commonly written, allocation of the latter being assumed to follow already well-established methods used in the preparation of the Gain and Loss Exhibit promulgated by the National Association of Insurance Commissioners.

Canadian companies transacting both participating and nonparticipating business are legally required to maintain separate accounts for each of these classes of business,* and this aspect of the subject was comprehensively treated by Mr. John Turnbull in a paper entitled "Separation of Accounts" which appeared in *TASA* XXVIII. Similar principles are followed by these companies in developing their shareholders' and staff pension funds. In the United States, however, the maintenance of fund accounts has been left, to a large extent, to the option of individual companies and no standard procedure for developing such funds has been adopted, although Section 216 of the Insurance Law of the State of New York requires that a foreign or alien stock life insurance company permitted to write participating policies and annuity contracts in that state must allocate to such policies and contracts "specific items of gain, expense or loss attributable to such policies and contracts and an equitable proportion of the general gains or outlays of the company," and that "in every annual statement made by any such company to the superintendent . . . such company shall exhibit the amount of participating policyholders' surplus."

With respect to any particular line of business, a fund account can be defined as its historical asset share. In its most elemental form it repre-

* The Canadian and British Insurance Companies Act, 1932, Section 79.

sents the accumulation, over a period of time, of premiums, investment income, and investment profits, diminished by contract payments, expenses, and investment losses, all of which are obtained directly from the company's accounts or are allocated to the line by some formula. Thus, without requiring complete segregation of accounts and assets, a fund account represents a close approximation to the amount of assets which would have existed as a result of the operation of the line had it been maintained as a separate entity. In many respects a fund account resembles a bank account to which credits and debits are made and interest added, but unless it is related to corresponding liabilities it is of no more value for purposes of analysis than are the admitted assets of a company if they are considered without reference to its liabilities and surplus. What may be referred to as fund account surplus is the excess of the fund over the appropriate liabilities.

## CONSTRUCTION OF FUND ACCOUNTS

Many companies will have available the necessary data for the development of fund accounts from the inception of the various lines of business involved, and a number of companies have doubtless adopted some form of fund accounting to be used in allocating net investment income in the Gain and Loss Exhibit, if for no other purpose. For companies which have no fund accounts, but which now desire to set up these accounts, the annual break-down of various statement items by broad lines of business, required in completing the Gain and Loss Exhibit, will form a convenient starting-point for the construction of the accounts. Fund accounts may be developed only for those lines specified in the Gain and Loss Exhibit, but it may be found desirable to maintain accounts for additional categories of business. Thus, for example, in the ordinary disability line waiver of premium and full disability benefits might be analyzed separately, or the annuity line might be subdivided into groups of policies which are of similar nature or which have been written on comparable premium rate bases. Fund accounts may also be of particular value in connection with individual group annuity and other group contracts.

In setting up fund accounts, the following basic premises must be established:

(a) *The Date as of Which the Accounts Shall Be Considered To Have Been Established.* It is most desirable that the funds be accumulated from the inception of each line of business if records permit. If sufficient data for the necessary allocations are not available for the earlier years of operation the fund accounts should be accumulated for as many years as possible.

(b) *The Assumption as to the Actual Amount of Each Fund Account at the Date of Establishment.* Where fund accounts have been accumulated *ab initio*, no problem arises. If this is not the case, it could be assumed that the policy liabilities as of the effective date of establishment represented the funds at that time, but, if a line of business had been in operation for some time prior to the date so chosen, substantial errors could be introduced as a result of ignoring the amount by which the actual accrual of funds may have differed from the policy liabilities on that date. A practical solution to this latter problem might be reached by allocating to each fund a portion of the company's total surplus then existing, in the proportion which the policy liabilities of the line bore to the total policy liabilities of the company, making any necessary modifications warranted by known special circumstances.

(c) *The Basis on Which the Accumulation Shall Be Carried Forward.* It is desirable that the sum of all fund accounts be related to assets in some manner, but this relationship will be governed by the contemplated uses to which the fund accounts are to be put. If they are to be accumulated for the sole purpose of allocating investment income, they could be constructed on a paid or cash basis to balance in total with the Ledger Assets, the base for the commonly quoted "net rate of interest." On the other hand, if they are being constructed for the purpose of permitting a more detailed analysis of operations and surplus, they might preferably be constructed on an accrued basis and be balanced with Admitted Assets.

It is possible that neither a paid nor a strict accrued basis might be considered entirely satisfactory and therefore some intermediate basis might be chosen. For example, the accounts could include accrual items with respect to investment income, and omit net uncollected and deferred premiums, since the latter can be regarded as deductions from reserves. Accident and health premiums due and unpaid, and premium notes, policy loans in excess of net value, etc., which now appear in lines 41 and 41A of the asset page of the annual statement could be considered as liabilities, and other not-admitted items, such as agents' balances and bills receivable, could be omitted entirely. This basis has the advantage of using the more stable book values of investment, while including legitimate income in the form of interest due and accrued, and excluding other items of a fundamentally non-interest-bearing character. Other variations in basic assumptions to fit individual situations may be necessary.

(d) *The Method of Allocation of Net Investment Income, and Various Investment and Asset Items.* Net investment income must be allocated in the Gain and Loss Exhibit and all companies must have adopted some formula for such allocation. If the fund accounts are to be balanced with

the Gain and Loss Exhibit by lines, the allocation of net investment income will necessarily follow the method used in the annual statement. Nevertheless, it may be helpful to review the considerations which must enter into the determination of a method of allocating such income.

There are in common use, for Gain and Loss Exhibit purposes, two broad methods of allocating net investment income—the fund account, and the policy liability methods. If the former is used, in most cases only relatively minor differences in amounts allocated will result whether funds are maintained on a paid or accrued basis, since many of the accrued items may be allocated in the same ratio as net investment income. The fund account method requires a yearly computation of mean funds, effected by adding to the funds existing at the beginning of the year of account, one-half the algebraic sum of income minus disbursements, excluding investment items. Net investment income can then be allocated in the ratio of mean funds. If it is known that any large transaction involving income or disbursements took place at a time which would destroy the validity of the assumption of a uniform distribution over the year, a correcting adjustment can be made. Items of the latter character might include excessively large endowment maturities or an abnormal distribution of premium income such as might result from a year-by-year sales campaign, occurring consistently in one calendar month.

The policy liability method is presumably used only in the absence of accurate fund accounts and therefore needs no serious consideration in connection with the development of such accounts. Passing reference might be made, however, to the theory held by some actuaries that where the amount of net investment income allocated to a fund is less than the amount of interest required to maintain the reserves of the line in question, such required interest should be the minimum amount allocated to the fund. It would appear that this situation calls for rather more definite action as discussed later under the caption "Fund Account Problems."

In considering the allocation of investment income, some companies have followed the practice of differentiating between types of assets. More specifically, lines containing policies with policy loan provisions have been credited with a rate of interest different from that credited to lines which do not have such policies. This practice has some of the elements of asset segregation, and it is a question of individual choice as to how far a company may wish to go in this direction.

Closely allied with the allocation of net investment income is the treatment of other investment items. Mean fund ratios can be used satisfactorily in connection with gross profit or loss on sale or maturity, and increase or decrease by adjustment in book values, but such items as the

excess or deficiency of book over market values would be preferably allocated using ratios based on the funds at the end of the year, since the transactions in question are more nearly related to the latter time. The allocation of most remaining asset items not otherwise allocable can be made in the ratio of mean funds, and where any such items are not common to all funds, special mean fund allocation ratios may be developed to include only the funds involved.

(e) *Methods of Allocating Other Income and Disbursement Items.* The Gain and Loss Exhibit calls for a detailed analysis of such statement items by line of business, and the methods used in obtaining figures for the Exhibit will usually be satisfactory for use in constructing fund accounts, if reasonable allocating accuracy has been attained. Since these methods are well-established in most cases, it does not seem necessary to amplify this aspect of the problem in this paper, other than to state that the ledger accounts of most companies provide for the direct allocation of many income and disbursement items, and that where these accounts are not sufficiently detailed, the valuation records will frequently provide subsidiary information which may be used in prorating items from the ledger accounts. If, for example, a company maintains a ledger account for gross ordinary premiums received, without segregating the gross premiums for disability or double indemnity benefits, the latter may frequently be segregated by prorating in proportion to the gross premiums in force for the several categories involved, using information usually obtainable from the valuation records.

The important problem of expense allocation has received much study in recent years and many companies have already developed satisfactory methods of analysis. For those which do not yet have such methods, a good recent approach to the subject is to be found in the paper entitled "Cost Analysis" by C. F. B. Richardson, which appeared in *RAIA* XXXV. The paper by Mr. Turnbull previously mentioned and Mr. C. E. West's paper entitled "Company Practice—Annual Statement" which appeared in *TASA* XXX, will also be found helpful in connection with general allocation problems.

TRANSFERS OF FUNDS

An important matter to be considered is the interfund transfer of certain sums which becomes necessary when a policy classified in one line is changed to another line. In most cases the normal policy change routine will take care of the transfer of any liabilities, but the accumulation of premiums, etc., must be transferred to the fund representing the altered status. Some typical examples of this type of transaction are as follows:

(a) *Supplementary Contracts.* When reserves for such contracts are transferred, as they vest, to a fund other than that which contained the reserve on the basic policy, a partial or complete transfer of funds will be accomplished through regular accounting channels. Where the actuarial basis for computing the benefits under some classes of supplementary contracts appears to be no longer adequate, consideration must also be given to the transfer of additional amounts sufficient to set up the reserves for the contract on an adequate basis, these additional sums for reserve strengthening being a proper charge against the original account. Transfers can also be made, year by year, to offset the expense of handling these contracts if interest margins remaining after debiting interest required and any excess interest are considered to be insufficient to take care of such expense. Expense transfers can be made either directly between funds or by modification of the formulas for allocation of expenses.

(b) *Retirement Annuity Contracts Changed to Insurance Policies.* In such cases it would seem proper to transfer from the annuity fund to the insurance fund amounts on the order of the reserve required to set up the insurance policy, the exact amount to be transferred depending on the company's change rules.

(c) *Retirement Income Policies Continued as Income at Maturity.* These policies are often written in such a manner that a supplementary contract need not be issued at the time income payments are due to commence, but if a supplementary contract is issued the comments under (a) apply. If no entries are made on the company's books, and it is felt that these contracts should be transferred to other funds after income vests, an amount at least equal to the commuted value of the income should be transferred. Reserve strengthening and expenses must also be considered in the latter case.

(d) *Group Conversions.* When a group insurance certificate is converted to a regular insurance policy, the group line is usually charged with the present value of the higher-than-normal mortality which is likely to be experienced. The total of such amounts can be treated as income to the ordinary life fund or as a negative disbursement therein, the latter practice being followed if such a charge is entered in the Gain and Loss Exhibit, since this is an artificially computed item and must appear both positively and negatively in the same horizontal line of the Exhibit inasmuch as it is not included among the income and disbursement items of the annual statement.

These examples, while not exhaustive, are sufficient to indicate the nature of the problem of transfers. It will be noted that no mention has been made of any contribution to the surplus of the original fund, which

might be taken into consideration when a transfer is made. While such a transfer would be desirable it would probably be difficult to evaluate any such surplus unless individual historical asset shares were readily available and, because of the expense involved in its determination, it can usually be ignored. If any transfer of substantial amount or special character were to take place, an estimate of the corresponding surplus which could be transferred would doubtless be made.

While the remarks on the subject of transfers have direct reference to fund accounts, many such transfers can be made in the Gain and Loss Exhibit and some companies already follow this practice.

### FUND ACCOUNT LIABILITIES AND SURPLUS

As previously mentioned, a fund account cannot be used as an analysis of earnings without reference to the corresponding liabilities. It was also suggested that fund accounts prepared on a paid basis could be used to allocate net investment income, but since it would be difficult to compute the corresponding surplus on that basis, it would seem preferable that the funds be set up on a basis which will readily permit a balance to the company's published surplus, in order to properly analyze operational results. The accrued basis, therefore, seems to be most useful in this respect, since, when it is used, the sum of the surpluses in the various lines will automatically add to the total unassigned surplus published in the annual statement.

The Gain and Loss Exhibit furnishes a yearly analysis of net gains from insurance by lines of business, but does not require the completion of the analysis to include investment gains or losses, and surplus items. Fund accounts, prepared on an accrued basis, and related to the corresponding liabilities will take into consideration all sources of earnings in each line and arrive at the surplus for the line. Fund account liabilities should not be difficult to determine, since most liabilities are originally computed by individual lines, and only such items as accrued expenses and certain suspense items will require allocation, if they have not been already used to adjust income or disbursements. For companies which maintain any type of investment reserve, mean or terminal fund allocation ratios may be used in accordance with the character of the reserve. Any other special liabilities which do not lend themselves to direct treatment may be allocated in a similar manner.

It should be emphasized, however, that while the fund accounts are balanced to total surplus, it must not be inferred that a line has the sole claim to any surplus appearing in its account, but rather that such surplus represents the contribution of the line to the total surplus of the company.

One accounting principle widely practised by commercial firms is that of closing out to general surplus each year the profits or losses from the various lines of business. It might be desirable to look upon the individual surpluses in the fund accounts of a life insurance company in somewhat the same light, since the total surplus of a company may be considered as being held for the protection of all policyholders, regardless of line of business, unless special charter provisions to the contrary exist.

The secular trend of profits or losses by lines becomes evident when the fund accounts are studied. Profitable lines of business produce few serious problems since it may be assumed that, should the line of business be participating, constructive equity can be done through various methods of distributing surplus. Where a line is tending to become unprofitable, however, the accumulative nature of the fund account for that line will reveal the fact at an early stage, and will usually provide clues as to the nature of the loss being incurred.

## FUND ACCOUNT PROBLEMS

If mortality, morbidity, interest or expense rates deviate unfavorably from the assumptions underlying gross premiums for any considerable period of time, fund account deficits may be anticipated since these accounts are credited with fixed contract premiums and the net investment income actually earned but are debited with amounts disbursed as contract payments and expenses which may substantially exceed the amounts expected. While investment profits made in recent years may have tended to modify the effects of declining investment returns and other factors tending to produce losses, fund account deficits have nevertheless emerged in some lines.

The losses thrown up year by year and accumulated in the fund accounts may be considerable in themselves, but when the existence of probable future losses is recognized, and reserves are strengthened, the deficits can become very substantial and can create further problems, particularly in connection with the allocation of net investment income. Where the fund method of allocating has been used, lines which have been profitable and have built up reasonable surpluses will have a margin on which investment income will be earned, so that the rate of net investment income can be less than the rate of required interest for short periods of time without causing interest deficiencies. Short term fluctuations in investment earnings are therefore less important in such fund accounts. If the trend of investment earnings is downward or if such earnings remain at an unsatisfactory level for extended periods, and if reserve strengthening has caused a fund deficit, the total amount of investment

income credited may be less than the required interest even though the rate of interest required to maintain reserves may have been reduced. In the latter case any deficit which may exist will be compounded by reason of such interest deficiencies.

Whatever may be the reason for the existence of a loss, if it appears that the class of business under consideration does not, of itself, have sufficient surplus-earning ability to ultimately recoup such loss, the latter must be deemed to be irrecoverable. In evaluating the amount of the loss, the present value of future liabilities should be determined on the most realistic basis, using the most probable mortality, morbidity and interest rates which might be experienced in the light of known trends, with full credit taken for any anticipated future sources of profit such as the return to surplus which might occur as a result of terminations. This calculation has the same nature as one which might be applied as a rigid test of solvency, and such present value, when compared with the amount of the fund, will be a measure of the irrecoverable loss.

It may happen that a loss can be traced to a particular group of policies within a fund, such as a series of annuity contracts issued with considerations based on inadequate interest or mortality assumptions. In this event, it will probably be impossible to construct a fund account for the group directly from the company's accounts and the use of some form of historical asset share valuation is almost imperative. If time and expense permit, such asset shares can be constructed for the entire fund as a check that the total of the individual items reproduces the entire fund with reasonable accuracy, and if the latter is the case, it can be safely assumed that the total for the group under consideration is a sufficiently exact measure of the fund for such group. Computation of the corresponding liabilities on the realistic basis previously mentioned will not present too much difficulty if reasonable approximations are used.

Where a significantly large deficit exists in a fund account or where an irrecoverable loss has substantially reduced its surplus, it will be difficult to view the remaining funds in their proper perspective unless mental reservations are made with respect to the ultimate treatment of such deficit or loss. The most practical solution to this problem may be to write off the irrecoverable loss in some manner, and the following fundamentals might be considered in determining whether this course of action should be adopted:

(a) It will be agreed that no line of business can stand by itself as a separate entity, but that each line is mutually dependent on each other line for financial support where needed. This is strictly in accordance with

the principles of averaging of experience and pooling of investments on which the present insurance company structure has been built.

(b) If a number of similar groups of policies fall in the same fund class it is by no means axiomatic that any irrecoverable loss arising from one group of policies must be charged solely against other policies in the same line, since the latter may not only have caused no losses, but may have ample surplus-earning power by virtue of a more adequate rate structure. It does not seem equitable that the mutual sharing of risk and responsibility should be thus confined only to those policyholders who, because of a similarity of policy contract, have been classified as belonging to a particular line, and apart from the question of equity, it would seem undesirable as a practical matter to assess any substantial amount of loss on older policies against the newer entrants to the same line of business, since premiums calculated on this assumption, or dividends on policies already written, would not be competitive.

(c) A study of Section 216 of the Insurance Law of the State of New York does not indicate that any single line of business can be considered to have the sole legal right to any surplus appearing in its fund account, and general reasoning corroborates this conclusion, provided that the charter of the company does not authorize a segregation of funds.

(d) When an unprofitable line has been completely discontinued as far as new business is concerned, and losses continue to appear, there can be no question but that these losses are a charge against the profitable lines of the company and must eventually be liquidated from the surplus of those lines, since the line itself has no surplus-earning power. This situation differs only in degree from that existing where a group of policies in a particular line has become unprofitable and has been discontinued.

(e) Strict equity presupposes no substantial shift of profits or losses between generations of policyholders and any write-off of an irrecoverable loss should be as small as reasonably possible so that equities will not be disturbed as would be the case if the actual experience in course of time should be markedly different from that assumed in the factors used in evaluating the anticipated losses.

## TREATMENT OF IRRECOVERABLE LOSSES

Since, therefore, it will probably be agreed that irrecoverable losses, regardless of the line of business in which they happen to occur, should be considered as a charge against the business as a whole, some formula for effecting the write-off of such losses must be adopted.

The following methods might be considered:

(a) Write off the deficit existing at the end of the current year in proportion to the surplus at the end of such year in the accounts for lines which have a positive surplus.

(b) Subdivide the deficit as nearly as possible with respect to the years in which it emerged and write off the separate sums in proportion to the surplus in the accounts for lines which had a positive surplus in the years under consideration. Historical asset shares would be very helpful in allocating the losses by year of emergence.

(c) Consider that the loss was incurred in the year in which an unprofitable contract was actually issued and write off losses in proportion to positive surplus at the end of such years.

(d) Use basic methods (b) or (c) but determine the write-offs in proportion to the profits earned by profitable lines in the various years rather than in proportion to total surplus at the end of such years. In this case it must be decided whether such profits should be considered before or after the deduction of dividends to policyholders, the former being preferable.

Method (a) ignores the fact that the surplus in some lines may have experienced a rapid growth in recent years whereas other lines may have grown much more slowly. Thus by deferring the making of a decision to write off losses for several years the rapidly growing lines would be charged more when the write-off actually occurred. Method (b) attempts to compensate for the inequity just mentioned. Method (c) allocates the loss further back in point of time, and is based on the theory that losses should be charged against surplus existing at the time the unprofitable policies were sold. Methods (a), (b), and (c) are based on the theory that total surplus is the proper measure of deficit-absorbing power. Method (d) substitutes surplus earned in the year of loss for total surplus as a measure of write-off, on the theory that losses incurred in any year are a proper charge against profits earned in that year.

If, as previously mentioned, a fund account has been constructed for a certain unprofitable group of policies within a line, the fund with respect to the remaining policies in the line can be considered as a separate fund account for the purpose of allocating any irrecoverable loss arising from the unprofitable group. In this manner, the profitable policies within the line will be charged with an equitable portion of the loss, but this would be practicable only if such policies have sufficient surplus-earning power to amortize this portion of the loss within a reasonable length of time.

In order that the surplus in other lines may not be reduced too drastically at one time, distributing the write-offs over a future period of from

five to ten years may be considered desirable. It must also be remembered that an allocation in any one year of losses resulting from reserve strengthening effected in that year might not be equitable to some of the other lines because the individual judgment exercised as to the exact time when reserve strengthening should take place can affect the amounts written off to other lines, by virtue of their different rates of growth, and some method of compensating for this may be desirable. However, where supplementary contracts arising from ordinary insurance are transferred to other funds when they vest, reserve strengthening done on or after vesting can be written off to the original line immediately, since the necessity for similar action will doubtless recur annually as new contracts vest.

From the discussion given above, it may be inferred that any losses are to be written off against all other profitable lines. In certain specified cases, however, it may be perfectly equitable to assess the losses arising in one line against the profits in a certain group of lines. High court decisions have made it clear that a disability provision issued in connection with an ordinary life or annuity contract can be considered as an indistinguishable part of such contract. Hence, in the case of an irrecoverable loss in the disability fund, a write-off might be made only against the ordinary life and ordinary double indemnity accounts, and also against the ordinary annuity account if disability benefits were issued in connection with annuity policies, no other line being charged. Where this special relationship does not exist, all profitable lines should share the loss.

### FUND ACCOUNTS AND SURPLUS DISTRIBUTION

In presenting fund accounts to management there is some danger that they may be regarded as a definite measure of the surplus available for distribution in any particular line. The error underlying such an assumption should be obvious when the company's over-all surplus position is considered, but there may be a tendency to disregard the effect of the less profitable lines, particularly on the part of those whose company interests lie solely in one field of operations. As a matter of practical administration, the existence of real or potential losses in any line cannot be ignored and an over-distribution of the surplus shown in the fund account of a profitable line could have serious consequences if the losses were disregarded. Such action could conceivably threaten the solvency of a company if carried to extremes.

Even if irrecoverable losses have been written off, fund accounts should be used cautiously as a measure of total distributable surplus, since the present surplus in the accounts is dependent on such factors as:

(a) The accuracy with which the accounts were originally established.
(b) The year-by-year consistency in methods of allocating such items as investment income and expenses, and maintaining accounting records.
(c) The extent to which approximations have been relied on in making distributions of premiums and payments by lines, where the general system does not provide such break-down.
(d) The policy followed in connection with retroactive application of improved allocation methods.
(e) The activity of the line with respect to new business.
(f) The general philosophy of anticipation of possible future losses, including the strength of the reserve basis.
(g) The method adopted in writing off irrecoverable losses.

When all the above-mentioned factors have been taken into consideration, the fund surplus still represents only the contribution of that line to the general surplus of the company. It must again be stressed that the mutual interdependence of the various lines from the standpoint of solvency cannot be ignored.

## CONCLUSION

Fund accounts can be set up and maintained in a variety of ways, and, while they should not be regarded as absolute standards nor as measures of comparison between companies, they will amply justify the labor and expense of their establishment, if, when presented as an aid to company administration, they are accompanied by complete and thorough interpretations of results, explanations of trends, and warnings of possible unfavorable developments.

To summarize, the most important advantages of the maintenance of fund accounts are:

(a) Extension of the information provided in the Gain and Loss Exhibit, to indicate the historical progress and present status of each line or subdivision of business.
(b) Dramatization of the earning power of each line, and analysis of the sources of profit or loss.
(c) Forewarning of the emergence of potential future losses, and underlining of the need for reserve strengthening if such exists.

Fund accounts afford a practical demonstration of the effects of the various factors operating in the life insurance business, which modern management will welcome.

## DISCUSSION OF PRECEDING PAPER

GATHINGS STEWART:

The title of this excellent paper is "Some Reflections on Fund Accounts." Mr. McVity undoubtedly used "reflection" to mean mental consideration but to us reflection also means "return of light" and he has certainly shed the "light" on this perplexing subject.

The paper mentions several important interfund transfers which are necessary in fund accounting. There is one type of transfer not mentioned which is important to a company writing both participating and nonparticipating business. Such a transfer occurs when a participating policy is changed to nonparticipating or *vice versa*. Unrestricted changes between the participating and nonparticipating lines may lead to anti-selection and should be avoided. However, there are instances when the change is feasible and perhaps necessary. For example, a company issuing life or term policies on a nonparticipating basis may wish to allow changes to endowment forms which may be issued only on a participating basis. If such is the case a transfer in funds becomes necessary. If the change is made within the first policy year the transfer can easily be made by reversing previous entries to the nonparticipating line and making the necessary entries to the participating line. The problem is more difficult when the change occurs in later policy years. Perhaps the asset share value of the policy being changed is the best measure of the amount of the transfer. This, however, involves the question of any contribution made to surplus which is not readily available. For practical purposes if the cash value approximates the asset share, it may be desirable to use the cash value as the amount to transfer.

There are several other brief comments I should like to make:

1. The state of Wisconsin has laws similar to those of the state of New York requiring stock companies to separate participating and nonparticipating policyholders' surplus. Also there are several other states, including Minnesota, Ohio, and New Jersey, which require the Gain and Loss Exhibit to be separated between the participating and the nonparticipating classes.

2. Mr. McVity mentioned items closely allied with the allocation of net investment income and stated that mean fund ratios could be effectively used for allocation of these items by line of business. An item in this category is Federal Income Tax and the mean fund ratios could be used

regardless of whether this tax is considered as investment expense or as insurance expense.

3. Mr. McVity's suggestion regarding the "write-off" of irrecoverable losses on lines with deficient funds is certainly an interesting one. Profits or losses for the current year on lines with large deficient funds are distorted because of interest losses resulting from such deficiencies. The "write-off" of irrecoverable losses helps prevent this distortion in future years' profits especially on lines where the reserves have been strengthened in regard to interest rates. However, such "write-offs" in a sense destroy the "historical asset share" nature of the fund account and do not give, in the years after the write-off, the "result of the operation of the line had it been maintained as a separate entity."

4. Among the important advantages of a fund accounting system are the useful by-products thereof. For example, after expenses have been separated by line of business for fund purposes, a further break-down by first year and renewal gives expense data suitable for premium, dividend, and asset share calculations.

W. DARRELL LAIRD:

Our growing need to know, as definitely as the nature of our business permits, where and why our companies are making or losing money, makes Mr. McVity's paper a particularly interesting and timely one. Fund Accounts are indispensable tools of management, but I am strongly of the opinion that they can be misleading, rather than informative, if we do not recognize explicitly the point at which they cease to be presentations of facts and become presentations of estimates. If they are to be useful, we must not attempt to make them do more than, in the nature of things, can be done. It is even more important, I believe, to realize that we don't need to regret the absence of information beyond this point, because we simply don't want it.

I believe our thinking will be clarified if we make a distinction between fund and line of business, or, as I would prefer to express it, between fund and class of product. The distinction here is with regard to ownership. Where we have two distinct sets of owners, I would suggest that we use the word "fund" and, where we have reason to subdivide, but have only one set of owners, I suggest we should use the phrase "class of product."

Many companies may not have distinct funds in this sense, but the situation is well illustrated by a Canadian stock company which conducts both participating and nonparticipating business. While the one management and staff operate both the participating and the nonparticipating funds, each is self-contained, each has its own assets and its own

liabilities, and each has its own requirements for contingency reserves and working capital. If one fund makes a profit, its owners are entitled to its distributable earnings. If the nonparticipating fund should get into difficulties, the participating fund could not be drawn on, as a matter of right, to help it out. If the participating fund should get into difficulties, the nonparticipating fund could provide help, since the shareholders are part owners of the participating fund also, but the help would necessarily, I think, be limited to the amount of the earnings of the nonparticipating fund which could properly be distributed and which, in other circumstances, would have been available for shareholders' dividends.

The basic question to be asked about a fund is, "Did it make or lose money in the last period of account, after making adequate provision for future liabilities and contingencies?" This question must be answered for each of the funds, because the owners of the several funds are not the same.

There are only two reasons, I think, for finding this question more difficult to answer for a fund than it is for a company which is not subdivided into funds. These are, first, that the fund is operated by the same people and from the same premises as one or more other funds, and second, that the investments in securities of the several funds are not segregated. These are difficulties, however, only if we *assume* that there must be a logically correct way of treating them. I believe that there can be no *logically* correct way—there can be merely a *contractually* correct way.

Mr. McVity refers to the possibility that two funds will grow at different rates. In connection with investments, this means that, since the rate of interest obtainable on new investments also varies, neither fund would now be earning the rate earned today on the whole portfolio if its investments had been segregated. The situation has more complications, of course, than these, for such factors as reinvestment and exchanges of securities also have a bearing. The simple fact is, however, that the investments are pooled and this means, in effect, that the owners have chosen to do this rather than to invest separately. The complexity of the situation is such that the concept of fairness, in any absolute sense, cannot be applied to the division of the investment income between the funds. Any method of division is correct, provided it has been agreed to in advance, but from the standpoint of the owners of one fund some methods will not be ones which they can wisely accept. In other words, rather than accept some methods of division it would be wiser for them to segregate their securities.

I believe the same ideas apply to the division of expenses. Certain costs are direct charges to one fund or another but there can be no logically

correct way of dividing the expenses which are not direct charges. I think this is evident for two reasons. In the first place, overhead expense is, by definition, expense which cannot be attached directly to an individual product, and if it cannot be attached to an individual product it cannot be attached to a particular fund. For example, there can be no intrinsically correct way, at the close of a period, of dividing the President's salary between the participating and nonparticipating funds. It is literally impossible to determine the time he devoted to each, and even if it were possible to do this it would be meaningless to do so, for the President must necessarily stand ready all of the time to handle the problems of either fund, and other problems as well which, in any strict sense, do not belong to either one.

In the second place, a division of the expenses of a period which has ended must be made by applying a formula, and I think only two kinds of formulas are possible. The first kind is simply arbitrary—for example, 75% & 25%—and because it is arbitrary, the concept of logical correctness cannot apply. The second kind was discussed by Mr. Turnbull in the paper to which Mr. McVity referred, and formulas of the kind suggested there make use of numbers of policies, premium income and so on. That is, they make a division in proportion to *re·ults*, while at least some part of the expense will be incurred in proportion to effort. Again, the concept of logical correctness cannot apply and any method of division is right, provided the inte·ested parties have agreed in advance, but some methods, from the standpoint of the owners of one fund, will be unwise. When we are dealing with funds, in the sense in which I am using the word, these divisions must be made since the difference in ownership is a fact which must be recognized, and they are made by methods which are not "right" but "accepted." When we are dealing with lines of business, or classes of products, however, since one set of owners own all of the subdivisions and the subdivisions are not and cannot be self-contained, we are not under the same compulsion to make these subdivisions. If we make them, it is because we want to find out something about a particular class of product, and the fact that the income from the total investment portfolio and the total overhead expense of the company are inherently undividable becomes important, for it has a direct bearing on the information we can obtain from the analysis.

At this stage, I believe our thinking will be clarified again if we distinguish between the accounting problem and the actuarial problem. The accounting problem is to state what took place in the past, and in solving it, we must be sure that we do not make statements about things which we merely assume to have taken place. The actuarial problem is to draw con-

clusions from the accounting statements and further conclusions from the facts which they summarize, to throw those conclusions into an appropriate form and to apply those conclusions, or hypotheses based on those conclusions, to the problems of the future—that is, to the premium and valuation problems. To carry the solution of the accounting problem beyond its natural limit will not add to our knowledge of the past, and may lead us to apply mistaken conclusions to the future.

I think we have to conclude that any subdivision of investment income and overhead expense, by class of product, is beyond the field of accounting, for such a subdivision must be based either on the assumption that there is a contractual basis of division or on the assumption that the basis used is an approximation to a *true* basis of division. Both assumptions are unwarranted, but the latter is the more dangerous, because it assumes that there is a true basis, and there isn't.

An accounting statement can set out the premium income, the benefits paid, the direct costs, and the change in the reserve, by class, and it can show the "gross profit" by class, but at this point all classes must be consolidated and investment income and overhead expense displayed in total only. Thus, the ideas of net earnings of a period and surplus accumulated over a period of years apply only to the company as a whole, and not to particular classes of products.

To a person like myself, who was brought up on the idea of completely separated participating and nonparticipating funds, each with its own surplus, it is a little disappointing, at first, to realize that the same type of subdivision cannot be carried meaningfully into a break-down, say, of the participating fund by insurance, annuities, accidental death benefits, etc., and, within each of these, by premium series. A little reflection, however, shows that a statement displaying the gross profit by class of product, which is all we can obtain from an accounting analysis, does provide us with all of the accounting information we need to have in order to approach our actuarial and managerial problems. For each class of product, it displays our experience, in the period, with respect to those things which are controllable within the class of product. It segregates those things which are independent of the individual class—investment income and overhead expense—but displays them in relation to the gross profit derived from all classes.

At the beginning of this paper, Mr. McVity sums up his point of view in the following sentence: "Thus, without requiring complete segregation of accounts and assets, a fund account represents a close approximation to the amount of assets which would have existed as a result of the operation of the line had it been maintained as a separate entity." When the funds

are operated as separate entities, as the participating and nonparticipating funds are in Canada (although with pooled investments and joint management), the fund accounts give us not approximations but exact figures. The sole purpose of my discussion has been to suggest that when the lines are not separate entities this fact changes the situation so completely that not only is there no exact figure to approximate to but it serves no useful purpose to create the hypothetical situation and assume that there is.

CHARLES E. WEST:

The recent adoption, by practically all companies, of the CSO Table makes it highly desirable if not necessary that some form of fund accounting be used to determine the assets and liabilities of policies issued on this basis as distinguished from the older policies issued on the American Experience Table of Mortality. Otherwise, the company would not be in a position to determine equitably the amount of surplus available for distribution between the two classes of business. For this reason, if for no other, Mr. McVity's paper is quite timely.

In establishing a fund account after the particular line or class of business has been in existence for some time, it is difficult, if not impossible, for the funds to be established as of the date of issue of the line. It is necessary to reproduce as accurately as possible the assets, as well as the liabilities which usually can be determined. It may be assumed that the assets are represented by these liabilities plus the surplus allocated to the fund. The allocation of this surplus can be made as suggested by Mr. McVity or it can be made in some other equitable manner, as, for example, consideration might be given to a constant per $1,000 of insurance in force plus a percentage of liabilities. This might apply where a fund was quite profitable, but upon which the liabilities were quite nominal. Other methods could be devised to give recognition to this situation.

Mr. McVity mentions that some actuaries hold to the theory that the required interest is the minimum interest income which should be allocated to a fund. While this appears to be good theory, if the required interest on a large proportion of the business should be so allocated, the results of such an assumption could possibly result in a larger investment income being credited to the funds than actually earned by the company. In addition, this also might be misleading, as it would fail to show the true status of the fund. It is quite possible that the fund has adequate margins from other sources, so the interest deficit is not a problem.

Mr. McVity implies, but does not state directly, that transfers can be made between funds to take care of deficits arising from expenses because of lack of interest margins after setting aside interest required and any ex-

cess interest paid. I feel it is important to make this transfer from the funds from which originating and not as a charge against the general surplus of the company.

I agree thoroughly with Mr. McVity's statement that surplus is held for the protection of all policyholders and should not be construed as belonging to particular classes as such. This becomes apparent when the company embarks on a new line of business. Obviously, the surplus of the company must absorb the initial expenses of establishing the business. It may be several years before the particular line begins to earn surplus on its own account. During that period the general surplus of the company has absorbed the losses. From a fund accounting basis, these losses should be repaid to the funds from which they were taken in relatively the same way in which they were borrowed. In fact, it would be an important thing to accumulate such loans from the various funds at the company's rate of interest so they may be repaid without loss to the particular fund.

When what appears to be a irrecoverable loss to the fund is written off, care must be exercised to make sure this loss is reconsidered in future years and if, because of changed conditions, the loss is reduced or eliminated, the surplus resulting should be transferred to the surplus of the funds from which it was obtained.

It is important in evaluating such losses to be as realistic as possible. If some doubt exists, it is not necessary to assume the most pessimistic attitude, as some of the loss may be deferred to a later date without serious harm to the various funds.

It should be borne in mind that any fund accounting is not exact. The assumptions made should be as realistic as possible, but even so it may well be that the results will show the relative rather than the exact condition of each fund. For example, a surplus was set up when the company was organized as a prerequisite for starting operations or a surplus may have been created by a line of business no longer sold by the company. Under the latter condition, it may be extremely difficult to allocate this surplus to the proper fund.

ELLSWORTH E. STROCK:

Mr. McVity has written a very interesting paper on the fundamentals of fund accounts and should be congratulated on the very thorough manner in which he has covered the subject.

I should like to mention one method of handling interfund transfers due to changes in individual policy contracts. In a company that writes weekly and monthly premium debit business, exchanges of several debit policies for an Ordinary contract are quite common and require a transfer

of funds between branches. On such changes, as well as changes of retirement annuity contracts to insurance policies, we have felt that it is proper to transfer to the Ordinary insurance branch an amount equal to the asset shares of policies in the Ordinary branch which are similar in all respects to the policies being issued. To simplify the calculations, these asset shares are expressed as a percentage of the cash values of the Ordinary policies, the percentage varying with duration. The actual transfer is effected through the surrender account. Where the volume of changes is large, it is possible to base the funds to be transferred during the year on a sample of the changes. From the sample a ratio of funds to be transferred to the amount of Ordinary insurance being issued can be calculated for each type of change and these rates can then be applied to the amount of Ordinary insurance being issued on the changes during the year to determine the total funds to be transferred.

Mr. McVity has treated fully the problem of writing off irrecoverable losses against all profitable lines of business. The problem is not a simple one. First, the determination of the irrecoverable loss will usually entail a good many assumptions as to future experience and there may be some question of exactly how much of a loss is irrecoverable. It is probably better to underestimate the loss rather than overestimate it, so that the transfer of funds will not have to be reversed in later years. Second, there is the question of how the write-off should be allocated to the profitable lines. Making the allocation in proportion to the positive surplus shown in the different accounts at a given point of time assumes that the surplus in each account at that time represented its deficit-absorbing power in relation to the other accounts. This will depend on the comparative strength of the reserves which were held in each account. If the write-off is done in proportion to the positive surplus at the end of some year in the past, it may possibly happen that the positive surplus shown at that time in a certain account no longer exists for the policies that were in force at that time, so that in effect the write-off is being made at the expense of policies issued after that date. Similarly, writing off a loss in proportion to the profits of certain years may not be proper, if the premium bases of the different accounts were not then comparable, or if there was some abnormal gain or loss in a particular account, or if the profits in a particular account were required for later losses or reserve strengthening. There doesn't seem to be a method which will not be open to some practical or theoretical objection. Perhaps the method least open to objection is to write off the loss in proportion to positive surplus at the end of a year when it is felt that the reserves held at the end of that year and premium rates for

current issues in the different accounts are on a comparable basis so that the surplus on each account represents its relative deficit-absorbing power.

I should like to mention one point in connection with setting up a fund account. In a company that has been maintaining fund accounts, it sometimes becomes desirable to split a single account into two or more accounts so that certain blocks of business can be studied. In such cases, to be consistent, it is essential that the methods used in making the necessary allocations of income and disbursements of past years be those that were used in the original allocations. This is particularly true of expense allocations where present methods may vary from past methods. Even where a major revision of accounts is contemplated, any change in the allocations of past transactions should be carefully considered, particularly if such allocations were used in the determination of dividends.

WILLIAM H. KELTON:

Mr. McVity refers to the practice by commercial firms of closing out to general surplus each year the profits or losses from various lines of business. I believe this is a most practicable method for nonparticipating life insurance companies to follow. There is little point in accumulating surplus and deficits, particularly the latter, on individual lines of business over long periods of years. I believe it is preferable for such a company to operate a general surplus account and to close out to such account each year the profits and losses of the various lines. We are interested primarily in the annual earnings by line and I see little use in attempting to identify the accumulated surplus by line.

Under such a method each line starts each year with assets equal to its net liabilities, namely, liabilities less nonledger assets. The earnings for the year are determined from this starting point and are closed out to surplus account after the year's operations have been completed and recorded. This method avoids some of the fund account difficulties mentioned elsewhere in the paper. In particular, it avoids the accumulation at interest of the deficits under a continuously losing line of business and the problems regarding disposal of such deficits discussed by Mr. McVity.

Under this method allocation of net investment income to lines is probably best based upon net liabilities. Reserve strengthening appears as a loss to a particular line in the year in which such strengthening is made and the loss is cleared out to surplus account along with other profits and losses at the end of such year. Over a period of years, the algebraic sum of profits and losses for a given line reflects the total results for the period without interest accumulation.

A possible variation of this method is to also operate a separate interest account and to credit each line with interest required to maintain its reserves. The interest account is credited with total net investment income and debited with the total interest required by the various lines. The balance of this account then shows the extent to which interest requirements are being met. The results under each line reflect only underwriting and expense items, variations in the interest factor having been removed by this method.

In allocating interest to lines, the general surplus account should draw its share of investment income. General contingency reserves would usually be included in the surplus account and specific contingency reserves in the various lines for which they were intended.

I believe the interest on such an asset item as policy loans should be assigned to the Ordinary line from which such loans solely develop. I do not favor differentiating between types of assets beyond the point of an asset such as policy loans which clearly arises solely from a single line of business.

WILLIAM M. ANDERSON:

I want to comment on three points. First, on the question of allocating investment earnings to different funds: the point is raised in the paper that some companies use a minimum allocation of interest required to maintain reserves. There is an awkward theoretical fault in that method. You may have a comparatively large fund with several parts, some of which have low interest requirements and others high, and you get a different result by that method of allocation than you would if you had the large fund broken up into smaller funds.

If anybody wants to persist in that practice, he might consider the more consistent method of charging all interest requirements for all funds against investment earnings and then using some appropriate method of allocating residual interest.

The second point is that the author did not deal at length with the question of allocation of expense. It seems to me that a great deal of work needs to be done on the problem of allocating overhead expense to the funds. I suspect that a good bit of the overhead expense of the companies is of such a character that it might most appropriately be allocated to the funds according to the surplus earning power of the various funds.

The third point is that we may be on the verge of moving over to a revenue form of statement. It seems to me that it is a most appropriate time for companies to overhaul their thinking as to what fund accounting they

should do within their own organizations, because with the revenue form of statement fund accounting will be a great deal easier to do.

I would suggest that companies in the course of making such a change-over might consider very seriously doing a lot of their original accounting on a revenue basis, *e.g.*, doing premium accounting at the time premiums are billed rather than at the time they are paid. I am sure that if you look into that problem you will find that you can simplify a great deal of the detailed operations within the companies.

(AUTHOR'S REVIEW OF DISCUSSION)

LEONARD H. MCVITY:

The discussion of the paper has added materially to its value and I wish to thank those who took the trouble to respond so fully. However, a few of the points mentioned have prompted further comments.

I agree in general with the statements made in the third paragraph of Mr. Stewart's discussion, but feel that the purpose for which a fund account is used must, in some measure, determine the practical conduct of the fund. It is possible to accumulate amounts written off at rates which reflect interest and other sources of profit and loss, so that a fund account can readily be converted to a "historical asset share." Where fund accounts are used for the purpose of allocating interest in the published Gain and Loss Exhibit, the current net gain from operations, or the apparent present earning-power of a line, can be seriously distorted if large losses exist in any one line of business. It would seem desirable to have this earning-power reflect current conditions, even though the historical asset share may not be immediately available.

Mr. Laird's contention that fund accounts could be misleading if they were to become "presentations of estimates" is doubtless true. However, if fund accounts are carefully compiled, they furnish a great deal of factual historical information with respect to various lines of business. The question of estimates need not necessarily arise if a fund has been built up from the inception of a line, or if detailed records have been kept for many of the years which the fund account purports to cover.

Statements made on the basis of the participating and nonparticipating funds of Canadian stock companies, where the line of ownership is rather sharply defined, may not hold true in the case of a multiple-line mutual company. The "contractual" nature of distribution of net investment income and profit probably does not exist with respect to the fund accounts of the latter type of company. It seems beyond the scope of fund accounts

to develop them as the sole measure of distributable surplus and, where strict equity is practiced through the dividend formula, the policyholders are doubtless willing to rely on the judgment of management as to the methods of accumulation of a fund which is purely informational and is in no sense contractual.

The development of fund accounts is naturally dependent on methods of expense allocation, but I cannot agree with Mr. Laird's statement that "there can be no logically correct way of dividing the expenses which are not direct charges." Many companies have developed methods of expense allocation which very closely approximate an exact distribution of expenses. It seems questionable, therefore, to conclude that those fund accounts which cannot be computed with minute accuracy are not worth while, since much can be learned from a fund which has been computed with even reasonable approximations.

With regard to Mr. Kelton's remarks on policy loan interest, while it was mentioned in the paper that interest on policy loans has been considered by some as a proper credit only to the Ordinary branch, it is my personal opinion that there are many reasons for considering that policy loans are just another form of investment and that such investment is made from the pooled funds of the company. Hence it is perfectly proper to merge such investment income with the income from all other invested funds.

The discussions of those not specifically mentioned above have presented some very helpful suggestions and have indicated some interesting points of view which it is well to have on record.