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A SYSTEM OF DISTRIBUTION OF SURPLUS FOR PARTICIPATING DEFERRED ANNUITIES

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INTRODUCTION

THIS paper discusses the problem whether an office should issue with-profit deferred annuity contracts, and having concluded that with-profit contracts should be issued, it discusses a consistent system for the calculation of premium rates, the valuation of the business and the distribution of profits. Primarily, however, it describes what has been done in one particular case and refers but briefly to some other possibilities, there being no doubt that the discussion will embrace other systems of distribution. The approach in this particular case started from a large existing portfolio of non-profit group deferred annuity contracts and the system of distribution was designed to be applicable to group business. In the result, however, a system has emerged which could be applied to individual contracts and which has been extended to embrace group deferred annuity contracts carrying the option to take a cash sum at the maturity date. In the latter application it is sound under different systems of taxation.

THE NEED FOR PARTICIPATING DEFERRED ANNUITIES

2. Consideration of this subject should logically start with a statement of the need for, or at least the desirability of, distributing surplus among participating deferred annuitants. This was referred to by Ogborn in a discussion in April 1951 (*J.I.A.* 77, 370) by Mills in *A.S.M.* 3, 86, by Elphinstone and Melton in *T.F.A.* 23, 85 and by Ogborn and Wallas in *J.I.A.* 81, 261. Nevertheless, I will restate those considerations which I feel to be the most powerful: they are so essentially the starting point of this paper.

Protection for the Office

3. The investigations and conclusions upon which this paper fundamentally rests were made in an office which had a large volume of non-participating deferred annuity business in force. That business had already grown to such a size that, in the event of any considerable and adverse contingency affecting it, the bonus-earning power of the whole fund of which it formed part might be materially affected. There was, moreover, a vivid realization that it would be easy to induce it to grow still further and that it might in fact prove impossible to prevent it from growing. There was, therefore, a strong desire to increase the margin for contingencies.

Equity for the Policyholders

4. Balancing this desire for a hedge is the feeling that the office should not make an undue profit from a particular class of business. It is surely a matter

of normal commercial prudence that an office should write business only in the hope that such business shall not be unprofitable. It will charge such margins for contingencies as it deems prudent to the intent that an ordinary sequence of adverse contingencies—a not unexpected swing of the pendulum—shall not embarrass the office. It follows that a not highly improbable sequence of favourable contingencies may provide a surplus which would bear an unduly high relationship to the participating business if the non-participating deferred annuity business were encouraged to grow without limitation.

5. One aspect of the problem is that it might raise questions of public policy if profits from a class of business derived directly from trade and industry, i.e. from contributions of employers and employees, should be distributed among the individual holders of participating whole life and endowment assurance policies. The two classes may represent different economic sections of the community. It is not inequitable to issue non-profit policies to individual lives, for the individual has the choice of taking a non-participating or a participating contract. If there are no participating deferred annuities, industry, so far as it chooses to invest pension scheme contributions with one of the life offices, is denied the choice granted to individual policyholders and must see any profits arising from the business it places with such offices diverted to another section of the community.

6. These then are the grounds most cogent to me on which an office might decide to transact with-profit deferred annuity business. From time to time one or the other may seem the more important but they should be regarded as complementary.

THE SOURCE OF PROFIT

7. The major uncertainties arise from four factors, and the experience in regard to these will largely determine the amount of profit or loss resulting from transaction of deferred annuity business. These factors are mortality, expense, interest and taxation; I have probably written those in ascending order of doubt.

8. There are two other sources of profit which have been important in the transaction of group pension business, namely, the associated group life assurance business and surrenders. I think that these sources should be less important in future, and it may be convenient at this point to state my reasons for this view. The risks of realizing capital profit or loss from investments is closely bound up with the possibility of matching investments and with the guarantees which are given in respect of surrender values.

Ancillary schemes

9. Side by side with a pension scheme it is common practice to operate an ancillary scheme providing some form of death benefit. This may be a group life assurance scheme under which the amount payable on death is a single capital sum, or is a series of instalments of a capital sum; alternatively, a widow's pension or even an endowment assurance may be provided. In any case it seems most inappropriate that widely different rates of mortality should be assumed in respect of the two contracts which are so closely linked.

A difference between assumed and experience rates of mortality is one source of profit, and this affects deferred annuity contracts and group life assurance contracts in opposite directions. There has often been a tendency (probably because group life assurance schemes were assured at the same premium rates whether there was an associated pension scheme or not) to overstate mortality in computing group life assurance premiums and to reduce to a very fine amount the total profit to be expected from group pension premiums. So long as the majority of pension schemes provided reasonably complementary amounts of annuity and assurance business, this arrangement, though illogical, was not unsound. I think, nevertheless, that we should use the same mortality basis for the same life under two concurrent contracts, but I must add that I think that different premium rates should be used if a group life assurance contract is issued alone.

Surrender values

10. The guarantee of surrender values on a generous scale constitutes a danger to any class of business, but the danger is magnified in group business where mass surrender may occur for purely financial reasons. Therefore the guaranteed values under group schemes have quite properly been on a cautious basis at the longer durations where the monetary effect of mass surrenders could be serious. It is felt that all steps possible should be taken in these days in the public interest to increase the portability of pensions; portability would in practice operate after a qualifying period of service, i.e. at the durations which have been associated with surrender profits, and this fact may tend to reduce the surrender profit of a group pension account. No doubt it will be impossible for a considerable time to make transferability of pensions universal, but there is already a considerable body of employers who are willing to be persuaded by an assurance company that they should allow the benefit in respect of service already rendered to employees who leave their service before the normal age of superannuation. Accordingly I expect that surrender profits will in future constitute a smaller proportion of the total surplus than hitherto.

THE PRINCIPLES OF DISTRIBUTION OF SURPLUS

11. I would advocate the distribution of aggregate profits from 'group' business among all the contracts. This seems to be an application of the very principle of insurance. In the North American continent the practice has developed of computing the profits of schemes severally and of making distributions related to the contributions of the separate schemes to surplus. This method of careful assessment of the experience in a particular organization may lead an employer's thought away from insurance towards individual operation or perhaps lead a life office towards the mere administration of trust deposits.

12. I feel quite strongly that before undertaking participating deferred annuity business and particularly before writing participating group pension business one should develop a consistent system embracing the three main facets of the actuary's responsibilities, namely, premium bases, valuation methods and principles of distribution. The system chosen should deal best with the profits which arise from the outcome of the most uncertain factors; these I would at present regard as interest and taxation.

THE METHODS AVAILABLE

Retrospective adjustment of premiums

13. I will first deal with a method which is not in my view strictly in the field of participation in profits. The dangers inherent in the form of guarantee of premium rates which has been used under non-profit group deferred annuity contracts are such that an office may decide that it will instead quote each year the rates at which the current year's premiums from the employer will be applied; the office quotes premium rates which are satisfactory to it according to the investment conditions at the time the premiums are paid, and in theory it is possible to employ such rates year by year as to give the appearance of a form of distribution of surplus. A variant of this is to quote minimum guaranteed benefits per unit of premium and to declare at the end of each year a bonus in respect of the premiums paid in that year, which bonus is determined according to the investment conditions which have obtained. Looking at the problem another way, one may consider that the office is quoting a provisional rate of benefit and is in fact determining the actual benefit (or inversely its premium scale) in arrear.

14. It is, however, rather difficult to see the attraction of such a method. So far as an office is concerned, a constant changing of premium rates must surely be inconvenient. Furthermore, even if only the current year's income has to be considered, it will be found difficult or impossible in some territories and in some currencies to match the liability and asset mean terms. I feel also that there must in ordinary circumstances be some further margin retained for distribution later to someone, that in fact this is not a complete and consistent system for distribution of surplus.

Cash bonuses

15. Turning now to systems under which surplus is distributed over the whole duration of the contract, or at least over a considerable period of time, one must consider whether the distribution is to be by way of cash bonuses or additions to the contractual benefits. Cash bonuses may take the form of rebates from future premiums (which would probably enure to the benefit of the employer). Now, it was stated in paragraph 3 that one of the primary desires was to increase the margin for contingencies and, since adverse contingencies are no less likely to occur in the more distant future when the annuities are in possession than in the near future whilst the annuities are still deferred, it may be considered imprudent to distribute the whole of the profit loading during the premium-paying period. Even though in the system which I shall describe this purism was eventually slightly blemished, the argument was felt to have very considerable force during the long discussions in which the system finally adopted was being devised, particularly because schemes may be discontinued and large blocks of paid-up pensions may remain on the books; it is not necessary to think only of nationalization to find substantial undertakings absorbed or merged.

16. Alternatively, the cash bonus system may be operated by a distribution of cash, not necessarily by way of reduction of future premiums. In this method one perhaps becomes more logical and can deal rationally with paid-up pensions, but this is at the expense of the system becoming impracticable;

a paid-up pension becomes in fact an immediate annuity of trifling and probably variable amount (the cash bonuses during deferment) merging into a pension of reasonable proportions (when the annuity is entered upon).

17. As to the second method, cash distribution, I do not think that many would like to distribute cash bonuses on an employee's own paid-up pension and as to the first, reduction of premiums, I do not like to contemplate large blocks of business remaining over from discontinued schemes becoming (by reason of the discontinuance, which may have been a matter of public policy) no longer entitled to participate in profits.

Bonus profits

18. Coming now to additions to contractual benefits, it is natural that the analogy of bonuses on individual assurance policies should have led to consideration of the possibility of a comparable bonus system being applied to group pension business. The analogy has been drawn by Ogborn and Wallas with an endowment assurance and they have thought of distribution during the premium-paying term.

19. Parenthetically I would add that this may lead to the thought that the policyholders of all classes should be regarded as forming a single comprehensive community of interests, and that the bonus rates on annuities and assurances should always move in harmony. With this endowment assurance approach, there will be a sympathetic movement while the basis of taxation remains unchanged, but a common rate of bonus is not likely to be equitable while the taxation bases of assurance and annuity business differ as they do at present. Under the system of distribution below described there is not the same sympathetic movement between the rates of emergence of surplus under assurances and annuities.

20. The analogy may, however, be drawn between a deferred annuity and a limited payment or single-premium assurance policy, and one may then think of distribution as additions to the benefit made throughout the duration of the contract; this was the basis of the system with which I am mainly concerned in this paper. The idea of an addition to the amount of benefit in each year of the continuance of the contract, implying, as it did, that the longer the annuitant lived the greater the bonus which would be given to him, was paradoxical. It seemed at first sight that the longer the pensioner lived, and hence the greater the strain he imposed upon the office, the more generous the office would be to him. The resolution of the paradox lay in the recurrent single-premium method of finance with which we are all familiar. If it is considered that every premium paid, whatever the basis upon which it was originally computed, is, after it has been paid, applied as a single premium to the purchase of a certain guaranteed amount of pension, then it can be seen that an interest profit on reserves held will emerge as a compound addition to reserves; this means that the surplus can be neatly absorbed by a compound addition to the amount of the pension secured to date. If, therefore, the premiums could contain as the bonus loading an interest margin, and if the business were valued on the premium basis, the interest surplus would equitably support a compound reversionary bonus continuing throughout the period of deferment and thereafter during the whole period the annuity is in possession. Such a method would release the surplus in steadily increasing amounts during the

period of deferment and thereafter in diminishing amounts continuing throughout the full period of the contract. This seemed to give an ideal solution to the requirement that there should be a hedge against future adverse contingencies. It remained, of course, to examine the implications in other directions.

A PARTICULAR METHOD

21. The method of distribution of surplus adopted in one particular case was based in principle on the conception outlined at the end of the previous paragraph. The system, which it was intended to apply to group business, had to be looked at from the several points of view of the participants in pension schemes and also a decision had to be made whether pensions in possession as well as those in deferment should participate in profits.

22. So far as *pensioners* were concerned, it seemed that a steady increase year by year in the amount of pension would be compatible with the increases in wage rates which seemed to have occurred, though at varying pace over a very long period.

23. This does not seem the appropriate place to start a dissertation on the relative merits of final salary and average salary schemes; but the fact is that many schemes are average salary schemes, and in these it appears that similar arguments would make the participating pension attractive to the *employee*.

24. The position of the *employer* is much more open. He might well, for much the same reasons as would appeal to employees and pensioners, accept a scheme under which the benefits increase by bonuses. On the other hand, he clearly could take the view that he wanted firmly to fix the benefits and then to pay whatever should prove necessary (perhaps after fixed contributions by the employees) to provide those benefits. As will be seen later, either of these views can be accommodated within the bonus system developed.

25. Although bonuses could be allotted on pensions in possession, it was eventually considered that this would not be the best system. Pensions are payable by monthly instalments and, in many cases, the periodical amounts payable are small. To make trifling additions to these monthly payments was felt to be impracticable. A possible solution would be to allow the profits emerging from the annuities in possession to be distributed as bonuses on annuities during the period of deferment. This would mean that the first generation of policyholders could not enjoy the full benefits for which they had paid, and that each succeeding generation would be benefiting from the past and passing a benefit on to the future. The amount of this transfer from one generation to the next would exceed the marginal amount which is normally passed on in a life office and would be a considerable part of the value subscribed by each generation. This solution seemed to be inequitable.

The final bonus

26. Faced with this choice between the impracticable and the inequitable, a third course was found which did not seem to offend too severely any logical canons. A bonus pension can be added year by year during the period of deferment: at the date a pension actually commences, its future duration is not unduly long; the whole reserve is already invested (in most territories and currencies the assets and liabilities can be matched over the terms of years

involved—so that without regarding the investment portfolio as split one can at least put any penalty of the inability to match upon the deferred annuities) and the future, therefore, does not hide so many uncertainties; at that time it is reasonable to re-value the annuity, paying some regard to the investments which are held in respect of the reserves. By thus re-valuing at a higher rate of interest than is used in respect of the deferred annuities, one commutes the bulk of the margin for contingencies and is able to add a final, or retirement, bonus to the pension in lieu of subsequent bonuses. Some small margin will, no doubt, be retained and will eventually be passed on to the next generation, but this was felt not to be inequitable, having regard to the usual methods of distributing surplus.

THE PREMIUM BASES

27. It is not necessary, nor indeed desirable, to set out premium bases, for each actuary will determine bases appropriate to the circumstances of his own office. It is, however, another matter to set out certain principles which I feel have general applicability. I will take it that the actuary wishes to issue a contract which shall provide alternatively (and subject to an option exercisable at maturity perhaps many years hence) a pension or a cash sum in lieu thereof.

Expenses

28. The premiums for group pension business may contain a simple percentage loading for expenses. Although the result may appear little different I prefer to regard the expense loading as composed of two parts: (*a*) a margin in the office premium to cover the expenses during the premium-paying period, and (*b*) a loading on the annual rent of the annuity to cover the expenses during the period of its payment.

The taxation of the annuity fund

29. The rate of interest to be assumed in the calculation of premiums cannot be determined without a consideration of the taxation of the annuity fund. I will deal first with the system of taxation under which the scheme described was set up in the United Kingdom, and I will start by looking back at Bayley's paper in *J.I.A.* **76**. On p. 243 he makes the fundamental assumption that surrenders shall cause neither surplus nor strain and he expands this assumption on p. 251. To pursue the method logically, when new business is written one should (in the case of a type C fund) extend the period for which the net rate of interest is used in the prospective valuation of the benefits and so increase the majority of surrender values likely to be paid. As the term progressively lengthens, one by one the surrender values will be reduced. Later, surrender values will fall generally, and at this stage the taxed period will be so lengthening that the deferred annuity premium rates will become generally uncompetitive. The failure to secure new deferred annuity business will now cause the taxed period to shorten until the office is again competitive in premium rates and is once more granting high surrender values. I should not choose thus to be the bob of a pendulum supported by my expectations of tax recoveries in respect of my notional loss fund. I should not be just to Bayley if I did not recall that he questions the ethics of his theoretical results. He also challenges us with his submission that the actuary must fix a standard which accommodates the facts.

30. I will attempt to describe such a standard. Let us consider a hypothetical new annuity fund issuing only deferred annuities. It will start by earning net interest; it can afford to grant surrender values and commutations on the basis of accumulation with net interest and it will not rely for this on any future events. Next some annuities will come into possession and consequently a higher rate of interest (higher than the net rate) will be earned; it would seem proper to give the benefit of this to the annuities in possession until the time is reached when all annuities in possession are receiving the benefits attributable to accumulation at a gross rate of interest and all surrenders the net rate. Ultimately there will be still more income—the redemption of the notional loss fund—and finally with a stable fund and stable legislation (perhaps a purely fanciful situation) all the interest will be received gross.

31. One must decide whether in this ultimate phase the lump-sum benefits shall involve accumulation at more than the net rate, or annuity benefits at more than the gross rate. For my own part I would be prepared to allow both to share in this surplus when it arises, but I feel also that a life office is entitled to hold a view that the public interest would best be served by preferential augmentation of one of the benefits and can properly act in accordance with that view. In this connexion the office will bear in mind that these contracts are usually issued in support of retirement benefit schemes, and it will consider the special purposes and needs of such schemes.

32. I have described the growth of a new annuity fund, but, of course, we do not often start new funds; we usually come in at some intermediate stage, and as we acquire more or less new business so we may make our funds younger or older. The acquisition of immediate annuity business also ages a fund.

33. There is one further point arising from the basis of taxation which should, I think, affect the surplus available for distribution to annuity policyholders. I think it reasonable to regard profits not reserved for annuity policyholders as properly subject to tax. In fact, however, when the growing fund reaches the point at which interest is received gross, there will usually follow a period during which the notional losses of earlier years can be set against the current profits, with the effect that the actual tax paid is less than the amount appropriate to the current year's profit. If it be accepted that the profits not reserved for annuity policyholders are properly subject to tax, there remains for the benefit of the annuity policyholders an additional sum representing recovery of tax previously paid.

Two rates of interest

34. In some overseas territories the rate of interest earned by an annuity fund is independent of the age of the fund and of the form in which the liabilities are discharged. In the particular case it was desirable to have a system of distribution of surplus which would be viable both in the United Kingdom and overseas. I shall find it convenient to refer to an 'earned' rate of interest which is the rate actually earned from time to time on the annuity fund. I shall also refer to a 'low' rate of interest which is the rate which the actuary regards as a safe rate to employ in calculating deferred annuity premiums; he may choose this rate in any manner, but when he has done so I think it will be true that, if he were to set down a table of double entry showing his estimates of the probability of specific future earned rates of interest against future years of

experience, he would put a very small probability indeed against any rate less than the 'low' rate in any future year. The 'earned' and 'low' rates may each be either gross or net, and when I refer to a 'net' rate I intend the gross rate less full tax at whatever may be the current rate—not an intermediate rate due to part only of the interest bearing tax. In some territories the gross and net rates are equal, and such territories are covered as a special case of the more general system for the United Kingdom.

35. I suggest that for premium calculations we should use realistic estimates of mortality and expense without large additional contingency margins therein. We should then use the gross 'low' rate to compute the deferred annuity per unit of single premium at each age and the net 'low' rate to compute the equivalent optional amount of cash. The two calculations show the alternative amounts of pension or cash available under the option to be exercised at maturity.

Margins

36. It is felt that, since the primary margin for bonus is the interest margin, the other elements should, as I have said, be assessed as closely as possible so that the profit or loss from mortality, etc., may be reduced to the minimum. One may then examine what interest margin should be incorporated in the premiums. Those who have had considerable experience of non-profit group pension business will be aware of the administrative disadvantages of varying premium rates. One would like to feel perhaps that, even though rates of mortality are moving as well as interest rates, the premium rates one quotes for deferred annuities should for long be safe within the tolerance provided by a reduction of the bonus rate to 0%, and that it should not be necessary to increase the premium rates for very many years. On the other hand, one does not wish to see too large a proportion of the ultimate benefit dependent upon bonuses. Each actuary will make his own choice between these limits.

Return of premiums on death

37. If deferred annuity contracts are issued both on the basis that premiums are not returnable in the event of death before the pension age and also on the basis that premiums are returnable on death, then the returnable premium contracts will require larger reserves, on which larger interest profits may be earned. It follows, therefore, that, in theory at least, returnable premium contracts should enjoy a slightly larger amount of bonus pension (for it is not suggested that a death benefit of the form under discussion should have bonus additions) than non-returnable contracts. Both on account of this theoretical complication and to solve the practical problem mentioned in the next paragraph it has been decided in a particular case that non-returnable premium contracts should be discouraged, and it would accordingly have been a matter of supererogation to have differentiated against the few contracts of this nature by means of a trifling variation in the bonus declaration.

38. It has been quite common for life office pension schemes to be arranged on the basis that the employee's contributions shall be returned in the event of death before retirement, and that the employer's contributions shall not be so returned. By adopting the non-returnable basis lower premiums can be charged, and this probably accounts for the fact that the basis has been so

widely used for employer's contributions. Nevertheless, the adoption of this basis has certain disadvantages. In the first place, where a large amount of premium has been paid by the employer for an employee (e.g. special payments in respect of past service pension) and the employee dies before pension age, the employer may feel that the money has been wasted, even though he has received a benefit in the form of the reduced rates of premium charged. Another disadvantage is that it is not possible to grant a satisfactory surrender value on withdrawal from service before the pensionable age (where a surrender value is the appropriate benefit) except on production of evidence of good health. When an employee withdraws in ill health and is not entitled to a paid-up pension in respect of the employer's contributions, the trustees must either accept a deferred pension, to draw which they must produce evidence of the employee's survival (though he will have no interest in the pension) or accept a reduced surrender value.

39. A further and, to me, most important disadvantage is that an employee on early retirement can share his pension with his wife only on production of satisfactory evidence of good health, thus depriving the wife of this cover in the very case where it will be of greatest value to her. The reason for this fact should perhaps be mentioned. If the premium is not returnable on death one cannot allow a favourable annuity rate to a sick man or give him the option to transfer some of the benefit to a more healthy life. If the premium is returnable one could in theory allow a sick man a higher rate of pension. In practice one is not prepared to assess the degree of impairment (if any) of each employee who retires; instead, one allows the option to transfer some of the benefit to a healthy wife.

40. For these reasons, but principally for the last of them, I prefer to use the returnable basis, and this basis has been recommended to employers with success. It has been thought that some concessions are likely to be granted over the years under contracts with non-returnable premiums because hard cases will arise. For this reason as well as because the decision had been taken not to differentiate in bonus the non-returnable premiums have in at least one case been calculated on slightly dearer bases than the returnable premiums. I do not think, however, that this fact has been decisive in the presently successful persuasion of employers that the returnable basis is preferable.

THE PRINCIPLES OF VALUATION

41. The principles of valuation (not the detailed technique) should be settled at the same time as the general principles (not precise rates of mortality, etc.) for the calculation of premium rates and the principles upon which the distribution of surplus is to be made. The premium rates and the experience determine the total ultimate profit, but the valuation basis determines the rate at which that profit emerges as surplus. Unless this rate of emergence is consonant with the premiums and the type of distribution chosen, bonus rates will be unstable and may become very inequitable. Under the system herein described, however the amount of a contribution is determined, it is applied as a single premium. Thus the premium payments in any year are, so far as the application of the money is concerned, quite independent of any premiums which will be paid in future years. The benefits valued are primarily the amounts of benefit purchased by premiums paid to date, though, of course, it

may be necessary according to the form of premium guarantee adopted to have regard to premiums which may be paid in future.

42. The valuation basis should, I think, approximate to the premium basis in use from time to time, and this in turn should not change often nor violently because mortality and expense forecasts are likely to move smoothly and the 'low' rate of interest should be much more stable than the 'earned' rate. I would take the primary benefit to be the annuity not the cash and would value on this basis. If this is done one should watch for the possibility of adverse financial options involved in the bases used for cash. At the valuation a surplus will emerge of which the greater part will represent the difference between the 'earned' and 'low' rates of interest. The bonus can be a compound bonus pension on the amount of the deferred annuity with an equivalent compound factor applicable to the optional cash sum. As the fund ages the rate of bonus pension will rise towards (or, if financial help comes from existing reserves, it will from the outset approximate to) the difference between the gross 'earned' and 'low' rates; the factor applicable to the optional cash sum will approximate to the difference between the net 'earned' and 'low' rates. Miscellaneous surplus and recoveries of tax previously paid and surplus arising from the fact that not all the interest content of surrenders is taxable at the full rate may be applied at discretion to augment either or both the bonuses. There is much to be said for weighting the scales in favour of the pensioners—they pay tax on their benefits.

43. Apart from future premium payments, an interest margin in the reserves will support a compound bonus on the pensions. In fact, a compound bonus is declared during the period of deferment. When the annuity is entered upon, however, a final or retirement bonus is declared and, at this time, it is not necessary that so large an interest margin should be maintained against adverse contingencies—the term of the contracts is much shorter than during deferment.

44. It follows from paragraph 28 that it is logical to make a specific addition in the valuation of the annuity to cover future expenses. I believe that in the past valuations have often been made at relatively low rates of interest, it being felt that the interest margin will cover future expenses. This conception might be rather unwise in the case of a closed fund. Moreover, even in the case of a continuing business the true position is obscured, for surely this is that, if proper provision is not made for the expense of paying the annuities, the valuation liabilities are equivalent to those computed with such allowance on a higher rate than that ostensibly used. I suggest that it would not be correct to think—as the reader of paragraph 516 of the report of the Millard Tucker No. 2 Committee might gather—that it is appropriate to value immediate annuity business on the basis of a net rate of interest.

45. This form of distribution, together with the valuation principle that the provision for future bonuses lies in an interest margin, will together secure for any given margin in premium that there will be a considerable delay in emergence of surplus, and consequently that there will be an economical use of the hedge by the office. One concomitant of this economy is that the deferred annuity bonus rate is more sensitive to changes in interest rates than that for whole life and endowment assurances. This fact can be easily demonstrated by the fact that if the 'earned' rate of interest falls to the 'low' rate the

rate of bonus falls almost to nil. I think that offices would find that the rate of interest could approach much nearer to zero before the bonuses under whole life and endowment assurances became nil.

INVESTMENT POLICY

46. The fact that the final bonus is substituted for annual bonuses during possession may suggest that during the period of deferment investment policy should be directed to the conjugation of asset mean terms with those liability mean terms (whether or no future premiums are brought into account) which would obtain if a cash value had to be paid at the retiring date. At such date reinvestment could take place in securities suitable for immediate annuities. The disadvantage of such notional split of the contract for investment purposes would lie in the erratic final bonus declared. It is felt that investment policy should not be rigidly divided and that the gap should be so bridged that a reasonably stable rate of final bonus may be expected.

47. I have referred several times to the mean liability term, but I have not indicated how this should be determined. One must start with the benefits already purchased, but should one include future premiums? Much will depend on the guarantee (if any) of future premium rates. Where there is such a guarantee (there are several forms thereof) one may consider whether to budget for future increases (by, for example, inflation of salaries) or for future decreases (by, for example, discontinuance of schemes). It must be recognized that if the investment policy has regard only to the premiums already paid, the rate of bonus is likely to be subject to a good deal of fluctuation. If some regard is had to the likelihood that future premiums will be paid, a considerable measure of stability will be given to the bonus rate.

THE REPORT OF THE MILLARD TUCKER NO. 2 COMMITTEE*

48. The Millard Tucker No. 2 Committee has recommended that the annuity fund should formally become a gross interest fund. If the Committee's recommendations are implemented, surrender values and cash options could be related to the accumulation of premiums at the gross rate of interest experienced, or to the benefits including bonus accrued to date, together with some allowance for future bonus. I do not, however, suggest that large surrender values should be guaranteed at other than the maturity date. I have already spoken of the cash sum at maturity being calculated at the net 'low' rate and then being increased annually to give effect to something approaching the net 'earned' rate. Whenever an option is given there must, of course, be some charge if the term of the assets cannot be satisfactorily matched with that of the liabilities. Surrenders are not quite the same as the cash option at maturity—the range of option is much greater. Here much more caution should be exercised in calculating any guaranteed rate, though, of course, the amounts actually paid may in good times be quite favourable. When guaranteeing surrender values under schemes one must remember the power trustees have (which they have in fact exercised on a very large scale in a case with which many actuaries are familiar) to take the surrender value when the

* Certain of the recommendations of this Committee (the Committee on the Taxation Treatment of Provisions for Retirement) have been embodied in the Finance Act, 1956.—Eds. *J.I.A.*

prices of securities are low and to invest their funds themselves. The guarantee should not run counter to the principles of participation by disbursing all future bonus loading. I am, in principle, averse to the guarantee of surrender values on a generous basis, as much as to investment in a security with a wide spread of optional redemption rates.

49. I cannot see that the implementation of this recommendation of the Millard Tucker Report would have any adverse effect upon the transaction of with-profit deferred annuity business. It would, of course, affect the cash equivalent at maturity of the bonus pensions and would have its impact on the form of the pension scheme, but I am concerned at the moment with the form of the annuity contract issued to the Trustees or Managers of the scheme; that would correspond to the form of contract which could now be issued in some overseas territories.

Individual deferred annuities

50. The implementation of the Millard Tucker Report would probably increase the number of individual deferred annuity contracts issued, and it would seem that the form of the distribution here described might be used for individual deferred annuities. It is, however, necessary to secure that the office records can expeditiously and economically provide the amount of paid-up pension year by year on which the bonus is to be declared. It is also noteworthy that the bonuses granted relate to policy years instead of calendar years, and this fact has to be borne in mind in dealing with the valuation and the preparation of any bonus notices which it is considered desirable to issue to policyholders.

51. There are two aspects of the system I have described which should have particular attention before it is applied to individual contracts. It has been stated that it is economical because the 'hedge' is large in relation to the bonus loading. The life office and the employer may understand and approve this economy, but the individual policyholder may take a different view. There will probably be both participating and non-participating contracts for sale, and the bonuses under the former may appear very small during the early years. The choice depends on whether the public will be much swayed by knowledge of the rate of emergence of surplus under endowment assurances.

52. Secondly, it is usual to allow an employee leaving a pension scheme a surrender value equal to his own contributions without interest. We might wish to allow the same surrender value under the individual contract, and the policyholder might well expect an even greater benefit. This would be more generous than our practice under schemes where the employer's premiums are not returnable in full in all circumstances of surrender, and would during the early years involve the loss by the fund of the expenses incurred and by far the greater part of the future bonus reserve.

THE METHODS OF FUNDING

53. Elphinstone and Melton discussed systems of funding, but the matter is of sufficient importance for me to return to it. The market has for long been used to speaking of *the* cost of a pension scheme. In the case of a with-profit scheme one might first think of a scheme providing certain guaranteed benefits for determinable costs—determinable on the traditional level annual

or the recurrent single-premium basis—with the bonus pensions enuring to the benefit of employees. Nevertheless, different methods of funding the liabilities have been used in individual cases with non-profit schemes, and it is desirable to synthesize these methods with the new type of contract.

54. A pension scheme is fundamentally an arrangement between the employer and the employees under which

- (*a*) it may be arranged that the employees shall pay contributions on a fixed basis, though it is not of the essence of the scheme that such contributions should be paid and, in fact, a number of schemes are non-contributory, and
- (*b*) the employee will receive retirement benefits which are usually determined on a fixed basis, and
- (*c*) there may be other benefits such as those payable on death or withdrawal which we may for the present purpose ignore.

The arrangement may be administered by trustees, as is the case with a scheme approved by the Inland Revenue under Section 379 of the Income Tax Act 1952, or may be administered in any other way.

55. By reason of (*a*) and (*b*) the employers will undertake some sort of liability to provide the balance of the cost. This liability may be contractual, but more often is revocable in regard to future contributions at any time. In the normal privately administered fund there are many ways in which the employer's liability will be spread. The pace of funding will vary widely, but the ultimate liability depends upon the basis on which the benefits are fixed, the basis on which the employees contribute and the experience of the fund in regard to such matters as mortality, withdrawal and interest and, above all, future changes in economic and other circumstances which change the level of remuneration, the normal age for retirement and the general level of benefits which is from time to time felt proper. One may say of pension schemes that the one thing which is certain is that change will be required; hence that to talk of *the* cost of a pension scheme is misleading.

56. The most important things in regard to the employer's costs are (*a*) that they should be spread having regard both to the employer's present capacity and to prudent avoidance of undue deferment of the cost, and (*b*) that the fund should be invested to the best advantage. As to (*b*) it is felt that the investment in participating policies is, over a long period, more advantageous than the investment in non-participating policies. As to the spread of the employer's cost under a scheme supported by with-profit deferred annuities, this can be determined in any manner formerly adopted either for the life office scheme or for a privately administered fund, and the moneys can be invested in the purchase of pensions on the lives covered by the scheme in such manner as may be most appropriate. If at any point of time the pension required under the scheme in respect of an employee is covered by the pension and bonus pension currently in force in respect of that person under the policy, then premiums in respect of that life may and probably will be terminated. Any further bonus pension allotted but not required in respect of that life may be transferred to another life. If in the case of any life a larger pension is required —as, for example, on early retirement—than has been purchased, then so much premium as is necessary can be applied to that life out of the current yearly payment. In fact, part of the pension already standing under the policy

against the name of another life might be transferred, for the fact that a pension stands under the policy against one life does not necessarily mean that that benefit is hypothecated under the trust to that particular member. The fund may be drawn as a common fund for the benefit of all members and no particular asset, whether it be a benefit under an annuity deed or a Stock Exchange security, will then stand hypothecated to any individual person. By the same token, the method of computing the annual payment by the employer may be by reference to individual lives or individual salaries, but this does not mean that those separate sums of money must be applied to the provision of benefits for those individual lives. The fund may provide that the money is available for the provision of the benefits at large. It is common practice for an employer to pay a fixed percentage of all salaries to a privately administered scheme in spite of the fact that the progressive employee is more costly than the person whose income is relatively stable throughout service.

57. It will thus be seen that flexible methods of funding the liability (which have been used in connexion with non-profit schemes for 20 years) and with-profit contracts combine to give remarkably flexible arrangements.

THE DEFECTS OF ENDOWMENT ASSURANCES

58. Under United Kingdom taxation it surely seems inappropriate to provide by means of endowment assurance contracts retirement benefits which include an option to pension. The maturity sum under such an arrangement must necessarily represent accumulations in a fund the interest income of which is taxed. Under a group life assurance and deferred annuity method there will be very little reserve accumulating in the assurance fund, and the deferred annuity premiums do at least stand a chance of accumulating at more than the net rate during the period of deferment. Surely this interest advantage (quite apart from the matter of expenses) should lead one to seek a solution to the problem of a cash option at maturity otherwise than by endowment assurances. There is the further question whether it is more appropriate to provide large death benefits for all employees or widows' pensions on the death of married men.

59. If a part (usually not less than three-quarters) of the retirement benefit is to be taken in the form of pension the contributions for this benefit will accumulate, under the with-profit deferred annuity, at the gross 'earned' rate after maturity and during deferment at a rate not less than the net 'earned' rate, but in the case of an older fund at a rate approaching the gross 'earned' rate. The other part of the retirement benefit can be granted at least the net 'earned' rate if cash be taken and, according to the policy of the office, may in the case of an older fund be granted a higher rate. Thus over a long period this latter part will not be worse and may be better than the endowment assurance whilst the first part should be better—unless the office is inconsistent in its guaranteed annuity option rates.

60. In certain territories there is some justification for providing retirement benefits by means of endowment assurances as alternatives to deferred annuities; there is no difference in the taxation of the two classes of business. The position in this country may be radically changed if some of the proposed alterations in our tax system are effected.

CONCLUSION

61. We had a paper on this subject in the last Session, the last to be written before we returned to Staple Inn; this paper is submitted to the Institute early in its occupation of its new quarters, and I think that this is a very happy accident. The subject is extremely wide and may form the basis of a large part of our work in future years. I have chosen to range widely, but I have endeavoured to deal throughout with principles, though I have illustrated by referring much (perhaps too much) to the particular practical application with which I am familiar.

ABSTRACT OF THE DISCUSSION

Mr J. Edey, in presenting his paper, recalled that Ogborn and Wallas (*J.I.A.* 81, 261) had mentioned a fund that had been established in 1816 to transact with-profit deferred reversionary annuity business, and in the discussion of their paper reference was made to the fact that with-profit pension schemes had been set up in 1931; but although that was history, he thought it would be agreed that in the past five years there had been quite an eruption of with-profit pension schemes. He had some knowledge of the first of such schemes and had based his paper on it. He hoped, however, that the paper would lead to a general discussion of the subject and that other members who had explored the territory would give the meeting the benefit of their explorations and would say something about alternative schemes for participation and the theoretical bases for those schemes.

Mr M. W. Melton, in opening the discussion, said that the paper represented what might be appropriately described as the second episode in the life of a new child born (or at any rate reborn) to life assurance—the with-profits pension scheme. The birth had been signalled over the past two years by several papers, in which attempts had been made to establish 'why' deferred annuities should be issued on a with-profit basis. The paper adequately described 'how' an actuary might solve the problem, and, although the author was mainly concerned with a particular method, nevertheless the principles discussed were as relevant for any alternative solution.

It was, perhaps, as well that they were reminded, in the comments on the possible methods of distribution, of the essential differences between pensions and ordinary life assurance business. Apart from the use of a different costing basis, pensions contracts included new benefits automatically each year, and in that way variations in premium rates under the normal forms of guarantee enabled non-profit systems to reflect changes in experience, and so themselves become pseudo with-profits.

It was a short step to the introduction of annual rebates, but that method could hardly be described as a true with-profit system, and it seemed to have an inherent weakness that it would generate more surplus than it would receive. The early cost, however, of such a scheme might be low compared with that of one where a substantial bonus loading was included in the premium rates.

Of the reversionary and cash bonus systems, he would favour the latter. It seemed to him that, since it was more usual in pension schemes to provide fixed benefits and, therefore, to use bonuses to reduce the employer's cost, the bonus was more naturally declared in a form to be used as a premium. But whatever method the actuary selected, it was important that bonus profits should emerge in step with the build-up of reserves. Single-premium costing was the rule rather than the exception in pension schemes, and a reversionary bonus related to purchased benefits or a cash bonus related to premiums paid was, perhaps, a logical choice.

Interest profits emerged in such a way that they would conveniently accommodate either of those methods, although for that to be strictly accurate the tacit assumption of a matched investment position was made for each single premium. Some departure from the theoretical position was, however, justified where future purchases of benefits could be made on guaranteed premium rates, and future increases of benefit were automatically included in each contract. The buffer provided by future bonus loadings was the justification for departing from exact matching, and in practice stable bonuses could be expected to result from the methods that had been described.

Actuarial opinion differed on the question whether bonuses should be declared both before and after retirement, or whether they should be limited to the period before the benefits became payable; the author preferred the former, but neatly avoided the practical disadvantage of increasing pensions that had vested. Although the provision of a final bonus would, theoretically, allow more 'cushion' to be retained by the office, the discounted value of future profits at maturity had to be calculated on a conservative basis; interest profits could, perhaps, be estimated more exactly, but mortality was still a problem, and, since the volume of vested annuities would be continually increasing, the adverse effect of improving mortality would be reinforced and would still demand the retention of a substantial margin.

Bayley and Perks had remarked in another connexion that 'there is no need to adopt an altruistic attitude to equity', and it might be felt that the inclusion of a final bonus was straining too hard for the unattainable. In pension schemes the contract had no defined end, and since the employer normally reaped the benefit of the bonus, perhaps it was not so important that, were the post-maturity period to be without profits, some part of the profits would be released during the working lifetime of a succeeding generation.

In determining a suitable premium basis and the margins to be included, the bonus loading was of paramount importance. Two years previously Mills had described a set of conditions which bonus loadings and a bonus system should fulfil; those had since been aptly described as 'Mills's Canons' and might well be accepted as the starting point for any actuary wishing to introduce with-profit deferred annuities. The author had pointed out that deferred annuity bonuses would vary more rapidly with changes in interest rates than would those for whole life or endowment assurances; for that reason, and also on account of the options that were included in pension schemes, it would appear reasonable to include a larger margin over the without-profit rates for deferred annuities than for life assurance policies. In conjunction with the use of a 'gross low interest rate' as defined by the author, that might well produce uncompetitive rates of premium, if bonus rates as high as those current for endowment assurances were assumed to be the criterion for calculating the size of the margin to be included. Some relaxation of that standard could well be justified if the particular bonus system retained a large part of the loadings or 'bonus reserve' sufficiently long for the effects of changes in the experience to be easily imposed on the bonuses actually declared.

Mortality could hardly be considered without attempting to assess its balancing effect in the usually linked deferred annuity and life assurance benefits under pension schemes. The author maintained that so long as the benefits were of apparently complementary amounts the same mortality tables (before pension age) should be used for both premium rates. An alternative method of solving the problem was to use mortality rates that were separately adequate for the annuity and assurance benefits, and to allow both to share in the profits that separately arose. The life assurance benefits could be increased by bonuses, in which case the combined contract became analogous to an endowment assurance, or they could determine their own refund of profits on the basis of the claims experience.

A point related to mortality and of some importance in the satisfactory operation of pension schemes concerned the question whether employer's contributions which had purchased benefits for employees who died before the pensions vested should be refunded. Undoubtedly to return the premiums in full would prevent any criticism by the employer that the money had been wasted, and certainly that method enabled early retirement to be more comprehensively handled.

Nevertheless, since for a certain level of benefits the cost to the employer would be higher if that provision were included, it was apparent that the employees would suffer if the employer were to be protected. As a design feature of pension schemes, the proposal itself was, therefore, not free from criticism, and, furthermore, the office would be removing from itself the onus, which it should accept, of insuring the mortality risk.

In discussing taxation, the author recalled Bayley's remarks on the taxed period of an annuity fund and the effect of a continuing new business—a characteristic of modern pension scheme business even without the completion of new contracts—but he discarded, at any rate in part, the theoretical solution.

At some time net interest only could be accumulated, and that would affect both the premium and surrender value bases. If wholesale surrenders were to be expected, it might, however, not even be safe to grant those values on the basis of accumulation with net interest. Bayley had pointed out that it was possible for surrender values calculated in that way to exceed the appropriate reserves because of the effect substantial withdrawals would have on lengthening the taxed period of the fund. That effect could be accommodated by making some assumption with regard to withdrawal in the original calculations, but it would be reasonable to assume that surrenders would not continue at such a high level as to make any adjustment necessary. The gradual development of transferability of pension rights would support the view that cash surrenders might be expected to be less important in pension schemes in the future, and in that connexion he congratulated the author on his invention of a most graphic expression 'pension portability'.

It would be generally accepted that profits representing recovery of tax should be distributed as they arose; the author felt that the distribution should take the form of annuity rather than cash benefits, since the primary object of a pension scheme was to make provision for old age. It would, however, be difficult to separate profits arising in that way for the sole purpose of determining what increased benefit should be granted to members of pension schemes, and it could be thought not inequitable that those profits should be regarded as a necessary additional contribution from pension business to general contingencies reserves.

The author remarked that valuation and premium bases should play an important part in determining the method of bonus distribution to be employed; and although he would agree that they were vital, severally or together, to the provision of adequate reserves and the proper release of surplus, they were, perhaps, no more than tools—important tools—but nevertheless essentially a means of enabling an actuary to operate a particular method of bonus distribution; the bonus system should stand or fall on its own merits.

The principles of valuation could quite easily be determined by examining the manner in which the benefits were normally purchased and the form of bonus it was intended to declare; the essential nature of most group pension contracts in the receipt and application of single premiums argued strongly for the valuation of benefits secured at any time. He would support the contention that an approximation to the premium basis was a convenient basis for valuation, although it might be thought that the reserves should be strengthened beyond that level to take some account of future premiums. That was, no doubt, desirable, and it was made possible through the existence in most funds of a large volume of deferred annuities built up over the past years.

The author's method involved a different rate of interest for annuities entered upon, for in those cases the annuity had ceased to participate in profits. The additional reserve was retained until the date of retirement and therefore provided an extra cushion for the office; if the system of distribution confined bonuses to the period of deferment and did not include any specific margin in the interest rate after retirement, it would also be logical to use two rates of interest in the valuation basis. Where purchased benefits alone were valued without reference to future premiums, that could, perhaps, reduce the reserves below a satisfactory level, but in any pension scheme there were existing at the same time a number of deferred and immediate annuities, and the real measure of the protection afforded to the office was the size of the bonus reserves.

It was fitting that in any paper concerned with pension arrangements the recommendations of the Millard Tucker No. 2 Committee should have a place. They had been alternately the cause of joy and despair among many bodies for quite a long time, and perhaps one day would return from the land of make-believe. The reversionary bonus system described by the author would be eminently suitable for individual deferred annuities, particularly where a maximum limit was set to the annual investment by Inland Revenue regulations. But since the premiums could vary each year, offices would have to solve for them, as for pension schemes, the problems of rate guarantees and fully-paid policy values.

One of the peculiarities of pension schemes was that there was an infinite variety of ways in which the benefits could be funded. The introduction of with-profit methods had seemed to release a flood of different plans, each with its own mysteries and none as comprehensible as the rather standardized non-profit methods. The employer, who was the ultimate purchaser of the scheme, was always concerned with a commercial assessment of any article he bought—and so would want to know its price. As the author so rightly pointed out, a pension scheme had no price in that simple sense of the word, and it was therefore quite essential to the proper development of the new methods that no misconceptions should be allowed to remain in the layman's mind about any of the underlying principles embodied in either the bonus system or the costing plan.

Mr H. P. Clay agreed generally with the author but disagreed on a few points, and in particular on the omissions. Such a paper would be read by actuaries abroad who were familiar with the English language, and he thought that some additions could be made here and there to give them a truer picture. In particular he proposed that there should be a differentiation, in speaking of with-profit pension policies, between *intended* participation and *possible* participation. British actuaries discussing individual ordinary life assurance spoke of a participating policy as one entitled to the full bonus rate of the office. Although they were aware that some offices also offered a low bonus—half-bonus, etc.—they were normally talking of a full bonus policy. In the United States, however, there was a different conception, and in the main the participating rate was a little higher than the non-profit rate, and there was a possible or a casual participation; there was not a definite bonus loading intended to produce a bonus which would then be varied by experience. Similarly, in group pension policies in the United States there was possible participation and not intended participation (a system current in Britain for a short time some twenty-five years earlier).

In reading the remarks of some people on with-profit policies and applying the test of intended participation or possible participation, he had found that he had to check one sentence in seven. Perhaps it might assist subsequent speakers if they were to mention that point if it appeared to be appropriate.

The discussion in the early part of the paper on the need for participating deferred annuities seemed to him to have an unfortunate sub-heading—*Protection for the Office*. He remembered being lectured on one occasion by an eminent man in life assurance, who said that an office was in business for the purpose of paying claims—which he supposed might be translated 'of providing cover'. If it could not provide all the cover on a non-participating basis, it might well decide to do so on a participating basis. But perhaps for completeness it should also be mentioned that there were two other methods: one was to write some non-participating and some participating; or, alternatively non-participating business could be limited in various ways. The second way, which appealed to him more, was to continue to write all the business that came from an existing set of employers, as they grew for one reason or another, but not to take more employers into the fold of that particular office.

He wished next to say something about surrender values from the point of view of the employer or the grantees or trustees of an approved fund if the policy was issued to them. He did not propose a solution, but he suggested that the office ought to be able to take in its stride any surrender value which arose because the employee took action in leaving the service of the employer and that that surrender value could be guaranteed to the employee as had always been done and the corresponding surrender value to the employer should be guaranteed. He did not have any sympathy with trustees who wished to take the surrender value on a policy because they thought at the moment that they could make better investments. That they should not have a guaranteed surrender value if such action was taken by the trustees was his firm belief; but guaranteed surrender values should be permitted if they were not claimed in order to exercise a financial option.

As far as employees' portability of pensions was concerned, he thought that more attention should be given to the attitude of the employer and particularly the employer's attitude to the length of notice given to him by the employee who left of his own free will. Men of above-average ability who resigned after giving merely the legal notice left a hole, because they were being trained for some senior position and somebody else had to be found and be trained. In the minds of many employers, such a person on leaving had no right to carry his accrued pension with him in so far as it had been provided by the employer, but, of course, it might be given to him as a privilege.

He agreed entirely with the opener on the difficulties of explaining the incidence of funding. That had been his personal difficulty for many years. He thought they should remember that the face of the employer changed every so often—either the man who had the power to decide that there should or should not be a pension scheme, or the man who ran it; and he would deplore anything which complicated such explanation to or understanding by that man.

He liked the idea that there should be more participating group pension policies, and he liked it purely because he was a member of the Institute. He thought that the lack of premium rate guarantees would enable the actuary to take a more realistic and less over-cautious view about premium rates, bonuses, etc., than he would under a non-profit contract.

He did not like the way in which the opener had introduced the word 'cushion' so frequently. 'Cushions for life offices' seemed likely to become as popular a phrase as 'feather-bedding for farmers'!

Mr M. E. Ogborn recalled that in the paper by Mr Wallas and himself, the emphasis had been on the need for participating business. The description of how participation could be arranged had been incidental to the main theme. They had thought that it was more appropriate for others than themselves to develop the theme in relation to group business. The author's ideas were fairly similar to what Mr Wallas and himself had had in mind for group business, especially the allocation of bonus on the accrued pension purchased to date of valuation. He was content to let the two papers speak for themselves.

In paragraphs 30–35 of the paper, the author suggested that the premium calculations should assume gross accumulations for the annuity and net accumulations for surrenders and cash options. His own view was that that suggestion could not be defended in theory, although it might be a practical solution of a difficult problem. The proposal required that the annuity benefit should be calculated on such a cautious gross rate of interest as would ensure that profits would emerge in due course, since it was only by way of set-off against such profits that the tax paid on interest during the deferred period could ultimately be recovered. Even so, other funds would have to subsidize the setting up of the full liability based on gross accumulations.

The real bogy was uncertainty. The method of taxation of the annuity fund placed offices in a dilemma. There were two extreme courses of action. Either the liability could be based on net accumulations during the deferred period (which was budgeting for a surplus, since some of the tax paid would ultimately be recovered), or the liability could be based on gross accumulations during the deferred period (which was budgeting for a deficit which should be, but might not be, recouped out of tax recoveries). The deficit was the valuation strain occasioned by setting up gross accumulations for the liability compared with the actual net accumulations of the fund.

The author recommended the second alternative, so that the office would budget for a deficit for a while. It was true that surrenders and cash options would tend to swell the notional loss on which tax might ultimately be recovered, but that prospect was long-deferred. He thought it would be agreed that anyone who budgeted for a deficit in the hope of its ultimate recovery should have a strong digestion and sleep easily of nights. To anyone of weak faith—as Scripture had it, 'a man of weak faith that eateth only vegetables'—he recommended the other course of assuming net interest and budgeting for a surplus.

Eight years previously he had submitted to the Institute a paper which assumed, as the author had done, gross accumulations for annuities and net accumulations for surrenders and cash options (*J.I.A.* **74**, 31). That paper had included a suggested adjustment to the principles of taxation of the annuity fund which would have made the procedure sound theoretically as well as practically. The suggestion was that the tax liability should be shifted from the interest received to the interest content of lump sums paid out. Those responsible had chosen to proceed on other lines. The difficulties were still with them and were likely to be so for many years to come.

The dilemma was in no way eased by the introduction of participation in profits, because the profits allocated to or reserved for annuitants were not taxable. The notional loss had to be set against the profits of the annuity fund which accrued either to the proprietors or to the life policyholders—not the annuitants. Indeed, since the profits allocated to annuitants would tend to exceed their bonus loadings, the remainder of the profit might be expected to be diminished, so that the notional loss would take longer to be recouped. In a mutual office the annuitants might well take all the annuity profits, making it impossible to recover tax on the notional loss. For that reason there was not as much difference as was sometimes assumed between an endowment assurance and a deferred annuity which participated in profits.

What, then, was gained by a system of participation in profits? It was, he thought, room for manoeuvre. The benefits could be adjusted to the experience through the allocation of bonus, and, as the previous speaker had said, a more reasonable attitude to estimates of the future could be adopted than with wholly guaranteed benefits.

In paragraphs 20 and 41–45 the author asked for a consistent system embracing premium bases, valuation methods, and principles of distribution of surplus. He thought that in asking for a consistent system the author was asking for too much, because the principles on which deferred annuity business should be valued were not at all clear. The annuity fund comprised contracts granted on widely different assumptions about income tax, some contracts being based on a net rate of interest, some on a gross rate, and some partly on net and partly on gross. It seemed unreasonable that all such contracts should be valued at one average rate of interest, ignoring the different tax positions. It could lead to nonsensical results. How should the tax liability be allowed for in the valuation?

Again, the author assumed that the whole of surplus could be translated into interest surplus and thence distributed in proportion to reserves. Theoretically, that was valid only if the funds were in short-dated investments, such as mortgages, where the capital was inviolate (it might be hoped) and the rate of interest tended to follow the market rate, with a time-lag. The reserve was then intact and each £1 of reserve could be assumed to earn the same rate of interest.

When the funds were invested in long-dated and irredeemable fixed-interest securities, as the author appeared to assume, the theoretical solution depended upon the distribution of the investments by date. Traditionally, such assets had been brought into the balance sheet at cost price, and that procedure made possible a solution which was fairly similar to the author's. The problem had been investigated by Bayley and Perks in dealing with the immunization of paid-up policies (*J.I.A.* 79, 14).

The whole subject of the relationship of problems of allocation of surplus to the kind and date of investment held was a fascinating one, and he felt that it called for further research. If the office claimed a greater freedom in investment policy than mortgages and fixed-interest securities, the traditional approach did not seem to him to be applicable. What should be the consistent system for valuation and distribution of surplus when investments were held in wider fields, such as equities and properties? That was a challenge to all of them, and he hoped that someone would come forward and deal with it.

Mr G. V. Bayley drew attention to the passage in paragraph 29 '...the bob of a pendulum supported by my expectations of tax recoveries in respect of my notional loss fund'. He had been at pains to point out in the paper referred to that future tax recoveries stored up in the notional loss account could *not* be anticipated.

On the taxation of annuity funds in the United Kingdom, he thought that any real difference between the author and himself was largely one of definition. He had used the word 'standard' in much the same way as statisticians used the word 'model'. He had thought there of a model which gave effect to the incidence of tax precisely where it was borne, in much the same way as actuaries had invented the 'true net interest' method for giving effect to tax relief on management expenses—in premium calculations, for example. There were often good reasons for departing from a model, and an example of practical departure was the application of the effective net interest method in place of the true net interest model. The author's standard involved a similar departure from the true model for annuity business. That was not in itself a criticism; in certain conditions it might work well; but it was possible to visualize increases in deferred annuities or withdrawals before pension age which would keep the fund type C for a considerable period—and that had in fact happened in practice. The author's premium and surrender basis would then work out exactly only if the actual annuities paid produced precisely the amount of tax relief he needed for the accumulation of premiums for pensions—which was another way of expressing what Mr Ogborn had said.

He agreed also with the opener's remarks that the exercise of a cash option equal to the return of premiums paid accumulated at a net rate of interest could result in a real loss to a type C fund (see *J.I.A.* **76**, 252). The loss could normally be recovered from tax relief elsewhere. Again, the calculation of immediate annuity considerations on a wholly gross basis did result in a real profit in the same conditions—if, of course, any could be sold on that basis—and type C offices had in fact reduced immediate annuity considerations by conceding something of their tax relief.

All he was saying was that by applying the author's solution instead of the true type C model, the profits on the fund would be sensitive to the distribution of business and the incidence of surrenders. There were well-known practical objections to adhering closely to the type C model, as the author had pointed out, and the remarkable basis of taxation was, to his mind, a compelling reason for the issue of deferred annuities with profits. The tax relief which an office might ultimately derive could then be distributed as and when it was received; and he would not then regard the sources from whence it came, as ascertained from the type C model, as necessarily an appropriate criterion for the ethical distribution of surplus. It was on that point that he was at one with the author.

He wished to refer to two of many similar passages in the paper which were to his mind linked. The first was in paragraph 20, in which the author said:

If it is considered that every premium paid, whatever the basis upon which it was originally computed, is, after it has been paid, applied as a single premium to the purchase of a certain guaranteed amount of pension....

Secondly in paragraph 41, the author said:

> Thus the premium payments in any year are, so far as the application of the money is concerned, quite independent of any premiums which will be paid in future years.

The thoughts behind those extracts had their natural implications for investment policy, and in view of the closely reasoned argument elsewhere in the paper, he had been sorry to find that the author really only went so far as to state the problem in paragraphs 46 and 47. It seemed to him that the consistent treatment of the assets was to couple their mean term with that of the liability to pay the pensions and other benefits purchased to date. The whole trend of the author's argument was in that direction; yet, in paragraph 47, he was assuredly flirting with other ideas—by bringing future premiums into account. Future premiums should look after themselves if they were to serve their purpose, and if they could not be expected to do so, then they were inadequate. Again, surely no policyholder would thank the office for stabilizing his bonuses at a low level just because his first one or two premiums had been invested at a low rate of interest. He realized that that cut both ways and that there was a lot more to it than that, but to attempt to invest future premiums before they were actually received—which was what the author was tempted to suggest in paragraph 47—forced in practice the taking of a view of the future trend of interest rates if only for reasons of competition.

On the subject of bonus distribution generally, he felt that in order to describe a complete model system it was essential to define the assumptions about the assets, and equally, in order to settle satisfactory valuation principles, it was essential to consider the valuation of the assets and the liabilities at the same time.

The author had some interesting observations in paragraphs 56 and 57, where he drew an analogy between a self-administered fund and a with-profit insurance scheme concerning the flexibility of the whole funding process. He assumed that at some stage an aggregate costing of the proposed benefits would be necessary so that the employer would know how much he was recommended to pay over a period of years. That would have to be calculated for him and it would therefore be interesting to know if and how the author would do it. If the employer was to be given realistic guidance there, it was presumably necessary to have regard to estimated future bonuses, withdrawals, ill-health retirements and even salary scales.

Mr M. D. W. Elphinstone, F.F.A., observed that in the opening paragraphs of the paper the author referred to three papers all of which had been published during the past two years, which was a rather unusual circumstance. That brought him to his first point: a year or two back a friend had said to him 'I see that you have got mixed up in with-profit group schemes. Quite the "new look!"' Indeed it was a 'new look'; it was not only a major development in life assurance, possibly the most important for many years past, but, saving political interference, might well be the most important for many years to come. But it was intricate, it was changing extraordinarily quickly, and it was in the hands of a few experts. So the more papers they could have on the subject in a short time, the better it would be.

As the variety of different schemes settled down, he thought that controversy would be focussed on one or two major points, and possibly one of them would be cash bonus against reversionary bonus. He hoped the author would forgive him but he was not quite sure whether to call his treatment of cash bonus schemes naïve or cavalier. He had posed a number of problems and, in posing them, had done the usual tactical trick of assuming that nobody else had answered them. He suggested that when the author was next quoting to a friendly broker, he should ask that broker to get a quotation for the same scheme from an office which he (the speaker) had in mind, when he would find his questions neatly answered; he might even apply to the office and get the answers in a more direct manner.

The author assumed, for example, that cash bonuses had to stop at pension age. But there was nothing to stop them going on after pension age, although the same practical problems came up that the author had described, and they could be solved by the same methods.

There were certain practical problems about employees who withdrew, but they, too, had been solved. They could be solved in different ways but he need only say that it was not necessary to pay out repeated cash bonuses to an employee who had withdrawn. Cash bonuses could be put into reversion. With-profit policies could be converted into without-profit policies; that was not usual, but it could be done. He thought that the disadvantages of cash bonuses were really that they caused a number of minor complications within the office rather than in the scheme; but in group schemes the reversionary bonus had a much more fundamental disadvantage since it was declared as an addition to the pension of each individual employee and got automatically earmarked to that employee. A reversionary bonus of £5 per annum to an employee aged 50 was not the same thing as a reversionary bonus of £5 per annum to an employee aged 30. They had different cash values. A cash bonus could be declared in a lump sum, it could be divided up at will, it could be used in any way, and it gave flexibility to the scheme later on when it was time for it to be modified. He did not think that there was the same flexibility with a reversionary bonus. The reversionary bonus scheme might be easier to work in the office, but the cash bonus scheme was probably the better pension scheme.

He had one or two points to make on the section of the paper relating to principles of valuation. In paragraph 41 the author said

> The principles of valuation...should be settled at the same time as the general principles...for the calculation of premium rates and the principles upon which the distribution of surplus is to be made.

It seemed to him that the only purpose of settling the principles of valuation at the same time was that they might modify the design of the scheme or of the bonus system. The bonus system and the scheme should be designed with two principles in mind: what was the best scheme that the office was able to offer for public consumption; and what was the best scheme for the good of the office as a whole? When those two points had been settled—and they comprised all sorts of things like cash and reversionary bonuses—then was the time to settle the valuation principles.

He had heard several comments that with-profit schemes were introduced for the benefit of the office. In their own paper the opener and he had emphasized the benefit to the public, and he still believed that: the schemes were not entirely for the benefit of the office.

In the same section the author stressed the importance of releasing surplus slowly. He, the speaker, was all for that—but it could be carried too far, and he thought that anybody who had to deal with the practical problem should bear in mind the saying about always jam tomorrow. Tomorrow 'creeps in this petty pace from day to day'. There were always new entrants coming into group schemes and always in any particular scheme there was quite a short-dated duration distribution. The opener and he, in their paper to the Faculty, had given a number of figures bearing on that problem, and they had come to the conclusion that it was difficult to produce a competitive scheme and at the same time to defer the distribution of the surplus as long as the office might like. The problem could be solved; the author's office and his own office had solved it, but it was not easy to solve and it would not be solved just by a statement of one side of the difficulty.

Finally, after making remarks which might have sounded a little critical, he wished to congratulate the author. When studying such problems it was necessary to go back to first principles. The author had produced an enormous amount of material of general interest, packed into a paper of which the title did not indicate its full scope.

Mr W. G. Bailey had come to the meeting largely for the purpose of instruction in case his office, which did not deal in with-profit group pensions, should at some time decide to follow the fashion.

He learned from Mr Ogborn and from Mr Bayley that it was not right to anticipate the refunds which might at some time be expected to come from the notional loss fund. He gathered from Mr Elphinstone that the author was withholding his surplus too long. Which of them was he to believe? At the time of speaking interest rates were such that some bonus could be declared on with-profit pension schemes out of net interest, but the time might come—as had in fact happened not so long ago—when the office seeking to issue with-profit group pension business would have to declare its bonus out of its notional loss expectations. He wondered what the offices would do when that time came.

Mr C. A. Poyser observed that a great deal had been said in the discussion on the technical problems of participating group pension schemes, and he had found it all very fascinating. Much had also been said about bonuses from the points of view of the office and of the individual policyholder but he remembered that those pension schemes were essentially group pension schemes. Current schemes were mostly trustee schemes whereby the trustees reinsured their benefits with an insurance company. Many of them, too, were in effect employer-guaranteed schemes in the sense that the employer paid whatever the insurance company said he had to pay—with an insurance company scheme there was no such thing as an actuarial deficiency. That being so, and since the employer would normally be paying by far the greater part of the cost, particularly if the benefits were related in any way to retiring salary, it seemed to him that the employer ought to have some say about the form which the bonus should take and its allocation. In other words, the life office should not present a universal scheme to all employers and say, 'Here is our bonus scheme; take it or leave it.' The office should, ideally at any rate, consult the employer and ask him, or possibly consult the trustees and ask them, how they would like the bonus or surplus which was available under the scheme to be used. It might be applied, for example, to increase the inadequate pensions that might have been granted on pre-scheme service or possibly to make up the pensions of members who had been more badly hit by the effects of inflation.

Mr A. S. Clarke wished, before confining his remarks to one particular section of the paper, to congratulate the author on the logical simplicity with which he had developed his argument and to say that he entirely agreed with his conclusions so far as they applied to group pension schemes. But on individual deferred annuities the author referred in paragraphs 50–52 to the economical use of the bonus loading and to the fact that, whereas the life offices and the employer might approve that economy, the individual policyholder might take a different view. His own opinion was that the individual policyholder would certainly take a different view unless the rate of compound bonus on pension purchased to date was at a comparatively low level, corresponding to a relatively small bonus loading.

In the discussion on the paper by Ogborn and Wallas, Mr Elphinstone had remarked 'If they were going to sell individual deferred annuities he saw little practical chance of getting away from the reversionary bonus'. In the same discussion, Mr Redington, in supporting the view that the bonus system for pension business should be an economical one, had said 'to have anything like the same buffer as under normal assurance business they would need an excessive bonus loading, one which it might be unwise to impose on the clients'. He had gone on to say 'The most common bonus in use could be described as a rectangular or uniform bonus. They could gain in economy in everybody's interest if they had a "triangular" or rising bonus'. Personally, however, he felt that in order to be practicable when applied to individual pension policies the triangle should be of a much smaller area than the rectangle.

For participating life assurance contracts, the public had become familiar with, and clearly supported, a method of bonus distribution that provided reversionary bonus additions to the sums assured. Valuations were usually made on a net premium method at a net rate of interest somewhat lower than the net rate used in the premium bases in order to allow for a level emergence of bonus. Bonuses arose primarily from a level loading surplus at all durations supplemented by interest surplus which increased with duration. Under that method a considerable proportion of the apparent 'bonus loading', i.e., the difference between with- and without-profit rates of premium, emerged even at the early durations and the assured could see that at all durations the bonuses allocated showed a reasonable return for the extra which he was paying in order to participate in profits.

In selling group business it was primarily the employer who had to be persuaded that the with-profit contract would ultimately be more advantageous, and the individual employee, who was only paying a part of the cost, was not intimately concerned with the total pension purchased to date. In selling a participating pension to an individual, however, more initial persuasion would be required with examples of future bonuses. Presumably some form of annual bonus certificate would have to be given to individual policyholders showing the basic pension purchased to date and the bonus pensions thereon. For young entrants, the amounts of bonus pension would look extremely unattractive for long periods after entry if a steep triangular type of bonus was allotted. A reversionary bonus declared on the total pension ultimately being purchased would not suffer from that defect.

In order to obtain some measure of the 'hedge' resulting from triangular and rectangular bonus methods applied to a participating pension policy, he had made some calculations for a contract taken out at age 20, pension to commence at age 65, on the assumptions

(*a*) that a compound reversionary bonus was declared based on the amount of pension purchased to date, and

(*b*) that a simple reversionary bonus was declared on the total pension ultimately being purchased.

The same participating rate of premium was charged in both cases.

He had found that after five years the value of bonuses declared on pension purchased to date amounted to only 10% of the accumulated bonus loadings compared with 55% if bonuses were declared on the total pension ultimately being purchased. Even after 25 years the percentages were only 50 under the first method compared with 75 under the second method. Throughout almost the entire duration of the contract the 'hedge', i.e. the reserve held for future bonuses, had been roughly double under the first method as compared with the second.

Apart from the selling aspects of the two methods of bonus distribution, there were other advantages, both technical and administrative, in adopting a simple reversionary bonus applied to the total pension ultimately being purchased for use in connexion with individual pension policies. Those were:

(1) Paid-up pensions would not have to continue to participate after becoming paid up.

(2) Surrender values would not have to include an allowance for future bonuses. Under a deferred annuity contract, since no life cover was provided, surrender values had to compare reasonably with premiums paid. That could not be achieved under the triangular method of bonus distribution unless a substantial part of the future bonus reserve was returned on surrender, which undermined the participating principles of that method. That criticism was less strong for group business since surrender only took place on withdrawal from employment and involved little financial option.

(3) The large element of deferment under the triangular bonus system made it difficult to achieve reasonable equity to policyholders entering at different times. Most offices had a tradition of paying the same rate of bonus to all participating policyholders irrespective of the year of entry. Under changing interest conditions, that procedure was bound to result in a certain amount of inequity as between different groups of policyholders, but the degree of inequity was much accentuated under the pattern of bonus distribution resulting from the triangular method as compared with the rectangular one.

(4) If individual pension policies using a triangular basis of distribution became a considerable proportion of new business at the expense of life assurance policies (which could occur if the Millard Tucker recommendations were implemented), the growth of emerging surpluses might be temporarily halted or even reversed, which could give rise to some problems for proprietary offices.

Mr H. A. R. Barnett agreed wholeheartedly with everything that Mr Poyser had said. Until Mr Poyser's contribution, he had thought that the meeting was about to forget completely the interests of the employer. The employer—and, for that matter, the employee—was not really interested in the taxation of the annuity fund of the life assurance office. The employee was interested, from the point of view of the pension scheme, in what his pension would be. The employer was interested either in what benefits the premiums he was prepared to pay would produce, or, conversely, in what the benefits he wanted to provide would cost. Those things ought to be borne in mind.

He thought he was probably right in saying that an employer who insured his pension scheme usually did so primarily to purchase the administration machinery of the office with which he insured, and from that point of view it was not unreasonable that a means should be devised whereby he or his employees could participate in profits. But it had to be borne in mind that while there were some cases where that might be applicable, there were others where it might not be; for example, if the employer was putting in a scheme where the pensions he was aiming at, apart from bonuses, were pensions of something like 50% of salary, then it was generally agreed, he thought, that there was some scope for additions to the pensions. Similarly, if he was putting in a scheme in which the pensions were based on average salary, there might often be scope for additions in order that the pensions should bear a more realistic relationship to the final salary. But suppose he was putting in a final average salary scheme in which the pension for the full period of service was two-thirds of the final average salary, was it right that bonuses should be granted in the form of pension additions, and if it was, what would be the views of the Inland Revenue? Would the whole scheme be disallowed from the point of view of the employer's and the employee's premiums? When considering taxation the employer and the employee had to be considered as well as the office. If the Inland Revenue would disallow either all or part of the premiums of the scheme, then it was necessary to think again of having a bonus declared in the form of additions to pensions, unless it was granted in the form of additions when inflation had occurred—and there again, he was not certain what would be the view of the Inland Revenue if the pension was already two-thirds of final salary.

For that reason he was forced to the conclusion that in many cases it might be necessary for bonuses to be declared only in the form of cash bonuses to the employer or of reduction of premiums or of cash payable to the trustees to be applied at their discretion in certain ways.

It occurred to him that there was one further possible way—he did not know whether it had ever been considered—of distributing profits, and it was that, if an employee was already entitled to the maximum pension which the Inland Revenue would allow, he might participate by being given the right to retire on that pension at an earlier date. He realized that that might be against public policy; he did not think that the Phillips Committee would altogether agree with it; but financially it seemed to him to be a possibility which might be worth considering.

Mr A. C. Edwards referred to the rebate system mentioned in paragraphs 13 and 14 of the paper. The rate guarantees that had, at least until recently, been associated with group deferred annuities had been such that the so-called recurring single premium policies were really annual premium policies subject to variable annual premiums. An office that wished to use single premiums and also wished to have a hedge against the full implications of non-profit annual premiums could weaken the rate guarantee by increasing the premium rates and then provide for rebates of premium in favourable investment conditions. As the opener had pointed out, the rebate system was not a bonus system in the ordinary sense. He thought that the author had perhaps been a little unfair to the system in those two paragraphs of the paper.

It was comparatively simple to fix a set of basic premiums that permitted a uniform rebate system dependent on current investment yields. The method was not difficult to operate in practice and it did logically follow the single premium idea. It was, in fact, a consistent non-profit single-premium system.

A further point concerned an analogy with pure endowments. The author's system was closely linked with single premiums and his reasoning therefore led him to triangular bonus accumulation with a large final bonus. Both those features meant an increase in uncertainty for the employer. That could be partly alleviated in suitable cases by the use of level annual premium deferred annuities, and there seemed to be no reason why they should not be regarded as pure endowments with a guaranteed annuity option. If suitable allowance were made in the premiums for the different tax position in the annuity fund, the ordinary rate of bonus of the office could apply, subject, of course, to the office retaining the right to differentiate; and since the annuity option would be fixed on a non-profit basis, there would be no need for the large final bonus.

In the paragraphs dealing with the Millard Tucker Report, the author referred to the possibility of the annuity fund becoming formally a gross interest fund and to the consequential possibility of surrender values and cash options being related to the accumulation of premiums at a gross rate of interest. The author recognized that that might lead to an increase in the number of individual deferred annuity contracts. It might also result in greater popularity for excepted provident funds based on deferred annuities with 100% cash options. If all that were to happen, how long, he wondered, would the Inland Revenue stand by and allow gross interest accumulations to be paid out as tax-free lump sums?

The author seemed to suggest early in the paper that the deferred annuities offered to industry should be with profits instead of without profits. Should not offices rather offer both with- and without-profit contracts, so that industry had the same choice as the individual policyholder?

Mr G. W. Pingstone said that, like Mr Bailey, he came from an office which did not at the time of speaking transact the class of business under discussion.

Without wishing to do an injustice to the author, he thought that the author would agree that the paper was an exposition of a particular solution, and presumably the author did not necessarily have the same degree of faith in other solutions. He felt that anybody who had examined that particular solution would perceive that it was elegant—as would be expected of one coming from that source. In particular, the degree of consistency between the bonus method, the premium basis and the valuation method did seem to be satisfactory, and he felt that anybody having practical experience in those fields would consider that those were very great merits, including the final bonus idea, by which was eliminated the problem of adding bits to existing pensions. The solution also seemed to achieve the primary objective of giving the office a cushion against adverse fluctuations, and it appeared to him that those offices that had adopted other methods had largely given up that cushion since they were left with little more cover than offices transacting non-profit business.

He was not quite sure whether the author was an advocate of the use of active service mortality or not. He had a feeling that the author's premiums did not allow for active service mortality; but that was something which other authors had had the temerity to expound, and he would be interested to hear what were the author's views.

against public policy that the shareholders and participating policyholders should receive a reasonable reward for the risks which they had helped to bear. It seemed to him that the matter of public policy, referred to in paragraph 5, was disposed of provided the office was offering both with- and without-profit schemes concurrently. That seemed to leave as the real reason behind the issue of with-profit schemes the protection of the office in circumstances where large volumes of non-profit pension scheme business had been written at rates of premium which did not contain a sufficient contingency margin. The level of that was, of course, particularly important when the ratio of non-profit to with-profit business was too high, and also in deferred annuity business, where the trend of mortality was always against the office throughout the duration of the contract. That adverse trend did not apply to endowment assurances and that was one justification—admittedly minor—for transacting certain business on that basis. For another, he could not do better than quote Lever who had said (*J.I.A.* **69**, 29):

So far as the majority of policies are concerned, namely whole life and endowment assurances,...the only arguments I can suggest for the issue of non-profit policies in these classes in spite of their unscientific character are (*a*) that they are better fitted to meet the particular contingency to be assured against, and (*b*) that clients want them.

Mr A. G. Simons, in closing the discussion, said that the contributions had ranged round quite a number of the problems raised in the paper, but until the last speaker very little had been said about the merits or demerits of with-profit or non-profit pension schemes or on the question whether it was then desirable to start a with-profit scheme. He did not propose at that time to try to open a discussion on that subject, but he wanted to throw out one thought. He thought that too much attention could be paid, in connexion with with-profit pension schemes, to the idea that a generation existed which had to have its profits paid back to itself. It had to be remembered that in pension scheme business there was not a generation which came in and went out, because the policyholders in the main were the employers, and in most with-profit schemes it was the employers to whom eventually the profits would go. An employer was essentially a continuing business. The actual shareholders might change, but by and large the employers remained much more as continuing bodies than did individual policyholders in a life fund. He thought that that should be borne in mind in considering the way in which bonuses should come out of a with-profit pension fund.

To him the most important thing was that a with-profit pension scheme, if it was decided upon, should be produced in a way which could be explained to the employer, and he felt that all of them should be grateful to the author for the very lucid way in which he had taken them through the various lines of thought which occurred in his case and shown them the answers to the various problems. At the same time, he was certain that the author would be the first to say that the answers produced were the answers in a particular set of circumstances; and it would be wrong for any reader of the paper to assume without careful thought that the answers might apply in other circumstances in another office.

He had said that the scheme should be simple to explain to the employer, and he hoped that he would be forgiven if for a moment he dealt with something which perhaps might be considered to be a little outside the normal line of the Institute. For many years in the past he had had the advantage of seeing the outside selling of pension schemes, and he was very worried that with-profit pension schemes might be sold by people who did not understand them to people who therefore could not understand them. He thought it was extremely important that the actuaries of offices should make quite certain that the people who would sell with-profit pension schemes should understand them and also make certain that they made the employer understand what he was buying. He did not necessarily suggest that the actuary should himself do that directly, but indirectly he should be responsible for seeing that it was done. It might be, of course, that in the future they would see more actuaries taking a direct interest in the selling of with-profit pension schemes, but only time would show that.

Paragraph 57 referred to the way in which the scheme was funded; but whereas one speaker had said that a lot was said in three lines, he regretted that he thought very little was said in three lines. There was a great deal that was not said, and he thought it would have greatly helped future readers of the paper if the author had found it possible to introduce hypothetical data relating to a particular model pension scheme and had shown how the with-profit scheme that he had in mind was applied to that hypothetical data and how the first year's cost was produced. After all, in selling a pension scheme, rightly or wrongly a lot of importance was placed on the first year's cost, and no with-profit scheme could be sold, in any quantity at any rate, if it produced a first year's cost much higher than that of the non-profit scheme. He was certain that the author was not suggesting that the first year's cost would be that much higher.

The author suggested that the valuation basis should be tied to the premium basis in order that it might produce in the long run a compound type of bonus. He feared that what the author was doing was suggesting the end of the actuary, because if the valuation basis was fixed, there would be electronic machines that would do it for them. He also feared that the author had ignored the fact that the stock market at the moment was liable to catch a cold in a very mild breeze and might easily catch pneumonia if anybody tried to inflate it properly; and if there was, as they had seen, a sudden heavy depreciation, particularly in an office which had suddenly expanded on with-profit pension scheme lines, he could not see how the depreciation would be met if the current practice was to continue and the balance sheet was to show the assets at market prices.

Many speakers had referred to the tax coming back or even being recovered by the office after the type C fund became or tended towards type A. He thought that too much importance could be placed on that word 'recover', and that word could even lead to greater optimism than was desirable. No tax was in fact recovered. What happened was that no further tax was paid until the total tax due on profits exceeded the tax already paid, and it should be remembered that the profits on which tax was due were not the valuation surpluses before distribution of bonus, but were the profits which were liable for tax under the tax regulations. They might all perhaps from time to time be optimistic as to whether or not Millard Tucker would come, but assuming no Millard Tucker, it seemed to him that if a fund wrote a lot of with- or even non-profit pension business and became a type C fund, it would be a very long time before it eventually recovered the tax which it had paid on the excess interest it had been earning while it was a type C fund.

Mr Ogborn had referred to the fact that he thought the author undoubtedly slept easily at night. He had no doubt that the author would sleep easily that night, fortified by two sleeping tablets; one was the fact that the child of his brain had been duly delivered, and the other that it had been thoroughly admired.

The President (Mr J. F. Bunford), in proposing a vote of thanks to the author, observed that towards the end of the paper he made the statement that it was felt that investment in participating policies was, over a long period, more advantageous than investment in non-participating policies. Clearly the author had in mind the advantages to the employer and to the employee where the scheme had been arranged with the help of a life office. He thought that that point had been underlined by Mr Elphinstone. He had not noticed any grave disagreement with the author's statement, with its qualifying phrase 'over a long period', although there had been at least one dissentient and there had been one or two warning voices.

So far as the life office was concerned, the author had given his reasons for thinking that the leavening of the lump of non-participating business with a little yeast of participating would be a good thing, and he thought that in that respect he and the earlier authors appeared to have made their case.

The author had been much concerned, both in practice and in the preparation of the paper, with problems of equity in the emergence and distribution of profits. There was a somewhat turbulent sea of cross-currents there, and he supposed that different individuals would perhaps adopt different courses through that sea.

There had been that evening not only a quite unusually large audience, but also a very well sustained discussion, and he was sure that the author would draw that comfort from it to which Mr Simons had just referred. There were naturally—and the author would wish it so—many points which could be discussed *ad infinitum* in the paper, but one thing on which all of them would be completely unanimous was their gratitude to the author for the work that he had put into the preparation of the paper and for having given the meeting an opportunity of discussing it.

Mr J. Edey, in reply, said that he was in the privileged position of having worked for a good many years on pension scheme business. It was the only subject on which he could write a paper for the Institute, and it was a subject which drew a large audience and which encouraged many people to speak. It was necessary for him to remind himself of that, or he might think that his paper was better than it was! Nevertheless, he expressed thanks for the very kind way in which the paper had been received.

He had had a few ideas himself on the subject, but he stressed that another advantage which he had enjoyed was that he had worked as one of a fairly large team. Others in that team had had ideas, and all their ideas had been reshaped before reaching the paper. All that he had done was to bring those ideas together and put them down on paper. He had not needed a collaborator for that purpose, but he wished to thank all his colleagues for making it possible for him to write the paper.

One phrase in the paper that had been mentioned in the discussion was 'portability of pensions', but he felt that he should acknowledge that the *Economist* quite a while back had had an article entitled 'Portable Pensions'.

Comment had been made on the question whether all business should be with profits or not. He thought that the life assurance industry should sell both with- and non-profit business, but until recently the position had been that the industry as a whole had offered only non-profit group pension schemes, and he thought that there was a real need for both types of scheme.

One or two speakers had expressed regret that he had not put one thing or another in the paper, but he had not wished to make it unnecessarily long.

There had been comment about equity between generations. It was true that if an employer continued a scheme for ever, there was not much to be said about equity between generations, but in practice schemes were discontinued and the question of equity did arise if ever deferred annuities were to be issued for individual lives.

He agreed with Mr Pingstone that the question of with-profit pension schemes and stabilized funding methods were entirely distinct. It was advantageous, perhaps, to use them both; they might be complementary, but a with-profit pension scheme did not absolutely require a stabilized funding method. If a fund was to be invested in deferred annuities, it should ultimately prove advantageous for with-profit annuities to be purchased, but that fact was quite independent of the method of funding. Again, the moneys which would eventually be needed to pay the benefits could be funded in many different ways, and that again was quite independent of the wisdom with which the moneys were meanwhile invested—whether in a with-profit life office scheme, a non-profit scheme, or an internally administered fund. In connexion with methods of funding, he would refer back to what he had said in the previous discussion (*J.I.A.* **81**, 284), namely, that they had a duty to the public to do all that they could to avoid misunderstanding of the forms of their contracts, which could scarcely fail to be complex.

As the hour was late, he would say no more, except again to express thanks for the kind reception which had been given to the paper.

The following written contributions have been received:

Mr W. Perks: I should like to stress the difference between the form and substance of a group pension contract, because the phrase 'recurrent single-premium' can easily lead us astray in our thinking. Although some of the implications of this phrase have led the author to a consistent bonus system that recalls certain ideas in the paper that Bayley and I submitted a year or two ago, yet this system owes its consistency and indeed soundness to the fact that a group pension contract with a rate guarantee is a permanent contract subject to variable annual premiums. The averaging that takes place in determining the amount of each bonus in the author's system, as in any other uniform reversionary bonus system in changing investment conditions, is only suitable for contracts subject to premium payments over a long period and owes nothing to the single-premium idea.

Group pension business started with non-profit contracts. The rate guarantee meant that essentially the contract was an annual-premium contract and it is important to pursue this thought through to the bitter end. The consequences for valuation and disposal of surplus are of the utmost importance—and I completely agree with Mr Haynes's remarks in the discussion on the paper by Ogborn and Wallas on the need to build up adequate additional reserves out of surplus. In fact, a lesson could be learnt from the non-life side, where it is common practice to put the greater part of the underwriting profit to reserve. Of course, unless the premiums are adequate there will be no surplus to put to reserve and I do not believe that total matching is any substitute for these sound principles.

I was interested to note the author's desire for a consistent system as expressed in the first sentence of the paper and at various other points. But there is a significant omission from the chain of consistency. I refer to the valuation of the assets. Not a word is said about this. I wonder why. While I agree with the author's reliance upon the principle of the premium basis for the valuation of the liabilities, this principle presupposes valuation of the assets either 'at cost or under' or on an amortized basis. The justification for confining attention to the paid-for benefits in the valuation of annual-premium with-profit business is given in the paper by Bayley and myself. But it may be necessary to stiffen the valuation basis if the experience goes sour in relation to the premium basis. And in some circumstances the guarantee of future premium rates may call for an additional reserve, but for with-profit business this is very unlikely and I suggest that the rate guarantee is also insignificant in relation to the kind of matching that is theoretically suitable. So that there may be no misunderstanding I should like to underline the word 'theoretically' because I believe that in this field there is a tendency for the theoretical model to get confused with practice.

In paragraph 47 there is an implication that bonus rates can be made more stable if we try to invest future premiums before we get them. I should myself question this. Anyway I very much doubt the wisdom of seeking stability of bonus rates in this way. Bonuses depend on yields and any attempt in practice to do anything but maximize the yield with safety would, I suggest, be a false objective.

Mr J. R. Dashwood: In paragraph 9, the author remarks that the use of widely different mortality rates for two closely linked contracts is most inappropriate. When, as is usual, these cover precisely the same group of lives a case may be made out for assuming the same mortality for both group pensions and group life contracts, especially when these form one scheme.

The author himself suggests in paragraph 35 that premiums should be based on realistic estimates, and to the extent that the same lives are covered under both contracts, a uniform basic mortality seems a logical and realistic assumption. The fact that in practice this might well entail the modification of existing loadings is a point for, rather than against, this proposal. For if two widely different assumptions are made simultaneously for the same lives, this implies that contingency or other loadings are included with mortality at least to the extent of the difference. When no estimate has been made of the actual mortality these lives are expected to experience, it is not possible to sort out the uniform basic mortality from the differing contingency loadings combined therewith for pensions and group life respectively. We can only conclude that the difference in mortality assumptions represents a net margin over expected mortality, but it seems by no means clear how to split this difference between the two classes. If, however, a realistic estimate of expected mortality is made in the first instance, these difficulties disappear and not only the mortality but also the specific loading assumptions will be correspondingly better estimates of actual experience.

In arriving at the theoretical formula for office premiums, mortality could be considered under three heads:

(*a*) *Basic mortality*. Best possible estimate of actual experience to be expected without any margins superimposed, although since the experience relates to the future the basis adopted could depart from current experience to an extent justified by observed secular trends. The resultant mortality estimates would be applied to both the pensions and temporary assurance benefits under group contracts.

(*b*) *Mortality Contingencies Loading.* Based broadly on statistical considerations of probable losses resulting from deviations of actual experience from (*a*). These loadings would be fundamentally different for the two types of benefit, and the wide differences in mortality assumptions to which the author refers could be reflected in (*b*) and hence retained to an extent statistically justifiable.

(*c*) *Special mortality loading.* This is to cover any element connected with mortality other than (*a*) and (*b*) for which allowance is to be made in the practical premium rates.

This approach in no way implies the abandonment of simple working formulae based on tabulated functions wherever possible. It does, however, mean that each such practical formula would have a theoretical but realistic office premium formula by which it could be tested and justified. If the theoretical formula was expressed without reduction or simplification, along with a description of all its elements, it would serve as a precise and detailed record of the premium assumptions. The practical premiums resulting from this proposal could even be identical with those based on mortality substantially heavier than experience, as used for group life rates in the past. If there were significant differences, and yet for reasons of policy, competition, tariff agreement, etc. the office did not wish to revise its rates, the same technique would still be applicable by tabulating the adjustments to premiums derived as above necessary to reproduce the former scale. These adjustments would then be written into the original theoretical formula and earmarked for what they were. It would probably be an over-refinement to attempt to break down the adjustments themselves into parts corresponding to the principal elements of the premium basis, but should any part be specifically connected with mortality it could be shown separately under (*c*).

It is, of course, the inclusion of the third heading (*c*) which permits this approach to be adaptable as well as realistic. For example, the uniform basic mortality assumption is, strictly speaking, only justifiable when precisely the same lives are involved and the benefits under the two closely related contracts are interrelated by amount. However, when this is no longer true (*a*) can still be retained provided that appropriate adjustments are made to (*b*) or (*c*), or both. The estimated effect of a mortality option against the office because the counterbalancing effect of annuity benefit related directly to death cover is absent can, for example, be included under (*c*).

A realistic approach to the calculation of office premiums seems no less desirable when there is a bonus loading which virtually assures the over-all adequacy of the rates. If participation in profits on a uniform basis is advocated, considerations of equity lend further importance to the construction of premium scales on bases as realistic as possible.

Only mortality has been referred to in any detail, but broadly similar considerations apply to the other major elements of an office premium basis, and an investigation aimed at establishing the best possible theoretical formulae in present conditions could achieve several purposes of practical value.

The contingency loading (*b*) varies with the number of lives in a group, as well as the dispersion of sums assured and pension benefits about the mean. If bonus is declared on a uniform system, it could conceivably be desirable to differentiate premiums by reference to two or three scales which would depend on the number of lives in the group. This point is strengthened when expense loadings are considered and some of the expenses are seen not to vary with size of group, and there appears a certain analogy with the position when rates under individual contracts are differentiated according to size of sum assured.

It is not impossible to vary bonus with size of group, but on practical grounds as well as certain points of principle—e.g. that mentioned in paragraph 11—it seems preferable that if investigation establishes a case for differentiation, then this should be effected through the contribution scales rather than by abandonment of the uniform bonus principle.

A final point in favour of realistic mortality assumptions is the avoidance of relatively large surplus due to the substantially overstated rates of mortality adopted in the past for group life premiums. This overstatement when known *a priori* can hardly have remained without influence on the other elements of the premium bases. Hence further distortion is created between the various sources of surplus, and complex corrections thereto become necessary in an attempt to derive assessments of true profitability, on the basis of which the actuary can recommend a tolerably fair uniform bonus rate for declaration.

Mr A. M. Pearson: In spite of experience showing that the margins in the calculation of premiums for deferred annuities should be considerable to avoid loss by the offices, I am still quite unconvinced that with-profit deferred annuities are the only means of establishing equity, since free competition between progressive offices reduces rates and therefore reduces margins sufficiently to avoid excessive profits, while providing a premium adequate to cover the risk. Such a premium must, in fact, exist, even if, in theory, it is difficult to decide what it is at any particular moment. The paper itself demonstrates the difficulties of establishing equity in the distribution of the surplus, so that it seems to me that the complication of introducing bonuses into this class of business hardly leads finally to equity, but instead produces complexities and difficulties without achieving the end sought. In addition, with-profit pension schemes in the hands of agents who do not properly understand them are likely to lead later to complaints with which the offices may have difficulty in dealing and which will reflect on the good name generally of life assurance in this country.

It is instructive to note that few of the offices that have been most successful with pension business advocate with-profit schemes, for they do not find a demand for them from the public; on the contrary, as has been admitted by those who advocate with-profit deferred annuities, the public has to be 'educated' to make the demand for with-profit schemes. It follows, therefore, that the desire to create this demand arises with certain life assurance companies for one reason or another and not primarily from a desire to give the public what it wants. This is most improper, for it is an inversion of the true function of any entity formed to serve the community. And, in any case, the 'education' of the public to demand with-profit schemes is only possible owing to the success of with-profit assurance in ordinary business.

One of the greatest dangers that all professional men incur is the preconceived idea and it is always well closely to examine our most cherished dogmas; we have all been brought up to believe that the with-profit policy in ordinary assurance is the most equitable method of doing such business, but is that really true? I do not say it is not, but it is interesting to speculate about what would have happened had Morgan of the Old Equitable not used the Northampton Table for his original premiums and so been forced to invent the with-profit system as a means of returning the surplus disclosed to policyholders. The with-profit system might never have been invented in that case for there is no doubt that it is contrary to life assurance as such, in that it provides the greatest benefit to the longest lives—as do bank deposits. The additional sum assured provided by the non-profit rate on the with-profit premium is real insurance, even though surpassed after a number of years by bonus accumulations, if the life assured lives long enough. However, the method is now firmly entrenched in the public's esteem and it is no bad thing (for assurance companies) that it should be so, but it is well to recall its defects and, I submit, it is undesirable to extend it to fields that have been most successful without it.

With regard to paragraphs 58 to 60, whatever the theoretical reasons for group life and deferred annuity contracts being cheaper than endowment assurances, in practice this is not so even after the reduction in premiums for group pension schemes that took effect at the beginning of this year. No-one maintains that endowment assurances are theoretically perfect for pension schemes, but in practice they have far fewer defects than other methods and at pension age they provide in the most convenient form the most flexible solution to the problem, giving advantages no other method can provide. Additionally, when the scheme is non-contributory, which is becoming more and more the method adopted nowadays, the endowment assurance method offers the employer a complete solution to his problems, which no other method can do, and covers at the same time in a completely satisfactory manner the needs of the employees. Since endowment assurance is one of the basic forms on which British life assurance companies have been built, I always find it difficult to understand the opposition sometimes shown to this simple and most satisfactory method.

Mr Edey, in his written reply, says:

Several speakers have referred to cushions for the benefit of the office and I was perhaps wrong to put paragraph 3 before paragraphs 4 and 5. But the second sentence of paragraph 6 should not be overlooked. It would not have astonished me in these days of high interest rates if more members had seized on paragraph 4 than paragraph 3.

I have stressed that the problems of funding are quite separate from those of participation in surplus. In a strict sense it could be said that paragraphs 53–57 were an irrelevance. The paper was already of full length and, therefore, I did not over-elaborate paragraph 56. This is perhaps unfortunate, for several speakers have, it seems to me, not fully appreciated this paragraph. Mr Melton, for example, prefers the cash bonus because, among other things, a pension scheme usually provides fixed benefits. I had this in mind in speaking of transferring benefits from one life to another. Mr Melton also thinks that if provision is made for the return of premiums on death, the cost to the employer would be higher for a certain level of benefits; but this would not be so if refunds of employer's contributions were re-applied in reduction of his subsequent contributions. If a method were adopted to stabilize the employer's cost, some account would be taken of the returns on death as well as of future bonuses.

Mr Elphinstone suggested that a reversionary bonus gets automatically earmarked to an employee. I have, however, stated in paragraph 56 that it is not necessary for any pension or bonus pension standing in the name of an employee to be hypothecated to him any more than a particular Stock Exchange security which happened to be purchased immediately after he had paid a contribution should be regarded as purchased out of that employee's contributions.

Mr Poyser suggested that the employer should decide how bonuses should be applied. Mr Barnett seems to think that the benefits to be provided (that is to say the arrangement between the employer and the employees) may preclude the investment (that is to say the arrangements made by the trustees) in with-profit deferred annuity contracts. Paragraphs 24 and 56 outline the considerable degree of flexibility which exists under the scheme and the latter paragraph was intended to indicate a method by which it could be used to support a final salary scheme.

Mr Pingstone enquired whether I am an advocate of the use of active-service mortality. In paragraph 35 I have referred to a realistic estimate of mortality which should, I think, have regard to mortality during service, but in making an estimate of future experience we must keep in mind the effects of possible future economic and other changes in all matters affecting it.

The valuation basis described in paragraph 42 was intended as a theoretical basis for use as a guide to the bonus rate to be declared and would broadly be suitable for this purpose irrespective of asset values provided that assets and liabilities were equally sensitive to changes in the rate of interest. As Mr Simons pointed out, it may be necessary, in the event of major depreciation, to publish valuation results on a different basis but this is no more than a problem of presentation which should not be difficult of solution.

In dealing with the taxation of the annuity fund I had first considered a hypothetical new annuity fund issuing only deferred annuities and then proceeded to say that we did not in practice start a new fund but came in at some intermediate stage. I do not think that the funds covering liabilities during the period of deferment earn less than the net rate of interest, and I do not think that the cash option calculated on such a basis (with, of course, appropriate allowance for expense and setting aside for the moment the question of depreciation) would involve the fund in a 'real' loss. Mr Ogborn has understood paragraphs 30–35 to imply gross accumulation for annuities. I intended, however, to avoid such inference being drawn when I said in paragraph 42 'The rate of bonus pension will rise towards...the difference between the gross "earned" and "low" rates.'