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GROUP LIFE AND PENSION SCHEMES

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THERE are many references to pensions in the pages of the *Journal*, most of them to the provision of pensions by means of private funds. I am proposing, however, to deal with the provision of pensions and life assurance by means of what are known as group schemes—a comparatively modern innovation. Pensions themselves are not new—in fact, references can be found in history to old retainers and the families of dead retainers living on the charity of the barons. More recently, however, pensions have come to be looked upon not as charity, but as something due as a moral right by virtue of long service. On the other hand, there is still a tendency to consider as charity the provision for dependents of deceased employees.

The recognition of a liability for prospective pensioners brought about the installation of pension funds, mainly confined to large employers. Insured pension schemes were also arranged many years ago, but by means of ordinary individual policies, either endowment assurances or deferred annuities. It was not until about 1918 that group policies for employees were issued in this country. Even then, for a few years, they were issued only by a few offices on a group-life basis, and group-life assurance did not attract as much attention in this country as in America.

The provision of pensions by means of ordinary individual policies was never a satisfactory method, as it was difficult, if not impracticable, to include provision for the most important section of the employees—those nearest to retirement. During the last 10–15 years, however, a number of offices have commenced to issue group-pension policies—deferred annuities on a special basis which minimizes as much as possible the effect on the *immediate* outlay of including employees near retirement. The best way to appreciate the difference is, perhaps, to consider the matter from the employer's standpoint. The scheme an employer normally prefers is one which requires a level cost from year to year, whereas ordinary individual deferred annuities produce a heavy cost in the early years, decreasing rapidly as the older employees retire and are replaced by younger employees. The group method corrects this tendency in three ways:

(1) Postponing for some years the whole of the employer's premiums for the pensions of the youngest employees.

(2) Postponing for some years part of the employer's premiums for the pensions of all other employees.

(3) Spreading equally over a period of years the employer's premiums for the major part of the pensions of employees nearing retirement.

Effect is given to this by dividing the pension for each employee into two parts, usually, although not necessarily, according to the length of past service and future service to the agreed retirement age. These two parts are known as 'the past-service, or additional, pension' and 'the future, or current, contributory service pension'.

BENEFITS AND DIVISION OF COST

The future-service pension may be on a flat basis or dependent on salary, while the past-service pension is usually based on the first year's future-service pension rate and may be calculated individually according to the total length of past service, or past service since some fixed age such as 35, or it may be irrespective of length of past service and may represent the additional pension necessary to increase the future-service pension to a fixed minimum pension, or to a minimum pension varied according to salary.

A not uncommon flat benefit is a pension of £1 per annum for each year of future service with a minimum pension of £26 per annum, whilst the following is a typical schedule of benefits varying according to salary:

Grade	Salary not exceeding	Pension for each year's future service in grade	Employee's contribution weekly	Lump sum death benefit
	£	£ *s.* *d.*		£
A	100	1 0 0	1*s.* 3*d.*	100
B	150	1 10 0	1*s.* 10½*d.*	150
C	200	2 0 0	2*s.* 6*d.*	200
D	250	2 10 0	3*s.* 1½*d.*	250
etc.				

The pension for future service calculated from this table according to salary from time to time will be increased by a past-service pension for each year of past service since age 18 calculated at one-half of the rate applicable to future service according to present salary.

Dealing first with the past-service or additional pensions, the cost of the total liability thereunder, which is invariably met entirely by the employer, is calculated as a lump sum due at the commencement of the scheme and is funded over a period of years by fixed payments, usually paid yearly. There are two methods of funding available, known as 'indefinite' and 'definite' funding. On the first basis each year's premium, *as received*, is applied as a single premium (non-returnable on death) to purchase outright deferred annuities for as many as it will cover of the employees not dealt with by previous years' premiums, in order of seniority in age and proximity to pension age. If a member dies or withdraws *before* his pension has been purchased, no payment is subsequently allocated to him. The second basis is virtually the equivalent of the purchase outright at the commencement on a non-return basis of all the past-service pensions by a lump sum, which is then loaned and repaid by equal instalments over a fixed period of years. Under both methods the amount of the annual payment is fixed at an amount not less than that necessary to ensure that as employees retire at pension age sufficient has been received to cover their pensions, so that once a pension commences it may be continued even if no further payments are made. This is a very important point and was not present at one time in the definite funding method. The essential difference between the two methods is that under the first the number of payments depends *inter alia* on the deaths which happen *before* purchase of pension, whereas under the second deaths are estimated in advance, and the actual deaths which happen have no effect on the payments. In each case credit is given for withdrawals whenever they may occur either by reduction in the number of payments or by a cash refund where applicable, or by allowing the withdrawing employee a paid-up pension.

Future-service pension. Reverting now to the second portion of the pension, in respect of future or current service, this usually consists of a pension of £1 (or multiples thereof graded according to salary) for each year of such service, and is paid for by joint contributions of employees and employers.

Each employee, irrespective of age, pays a weekly contribution in proportion to his pension per year of service. In practice employees' weekly contributions range from 6*d.* to 1*s.* 6*d.* per £1 pension depending upon the cost of the scheme and the generosity of the employer. A contribution of 1*s.* 3*d.* per £1 is probably the most usual now, but there is no particular virtue in 1*s.* 3*d.* except that it usually represents a reasonable proportion of the total cost for the employees to pay. Whatever the amount, however, the principle of a fixed ratio between each employee's rate of contribution and his rate of pension per year of service is normally retained throughout each scheme for simplicity in premium calculation.

The employer for his part pays the balance of the cost of the promised pension, and this cost obviously depends for each individual upon his age. Whereas the employee's contributions are on a 'returnable' basis, usually without interest, in order that he may be promised a refund of his own payments if he leaves or dies, the employer's contributions are usually on a 'non-returnable' basis but with a surrender value on withdrawal by the employee for a cause other than ill-health. The two contributions—employee's and employer's—are, therefore, kept quite separate, and this enables the employer's cost, if desired, to be charged on a basis other than that of a fixed level premium from entry to retirement. In practice the 'full level-premium' basis is normally used only in small or special cases. The basis most frequently used is that known as the 'single-premium' or 'current-cost' basis under which each year's pension is treated as a unit and the employer pays the difference, if any, between the cost of an individual employee's pension for that year and his contributions for the year. As the cost of a deferred pension of £1 increases as pension age approaches, it follows that the employer's 'balance of cost' for any one individual increases rapidly with age attained. The position is a little complicated by the fact that at young ages the employee's contributions may be more than sufficient to purchase the current year's pension, resulting in no contributions being necessary from the employer for a young employee until the time arrives when his total contributions to date purchase less than his accrued pension for service during membership of the scheme to date.

Future cost. The two great advantages of the 'single-premium' basis are that (1) no employer's contributions are required for the young employees (i.e. those most likely to withdraw), and (2) the employer's initial cost is kept low at the time when he has heavy payments to make for past service. The main disadvantage is that the cost is a varying one from year to year, usually with an increasing tendency until stability is reached, and great objection has been taken to the method on this account. The trend of the future cost depends upon the extent to which the reductions due to deaths, withdrawals and retirements offset the increases in respect of new entrants, increases in benefit due to salary changes and the advancing ages of the employees who remain. There are, however, many cases where the cost is likely to remain fairly stationary or where the prospects of the increase being substantial are remote, and in those cases the 'single-premium' basis is extremely suitable. There are still more cases where the future cost will undoubtedly rise steadily for some years and should then remain fairly stationary. There is little objection to the use of the method in these cases, provided the employer is warned in writing of the probable extent of the increase. Where it is likely that the cost will increase very substantially for many years and the ultimate maximum is difficult to estimate, the method should not, in my opinion, be put forward even if a warning is given, as an employer may be tempted to pay too little attention to the threatened but perhaps distant increase, and put into operation a scheme which he will later be unable to afford.

In such cases, and indeed in many others, a more suitable basis is a modification of the 'full level-premium' basis known as the 'deferred level-premium' basis under which an employer pays a level premium to pension age for each unit of pension for every employee over a fixed age—usually 30 or 35. This has the first advantage of the 'single-premium' basis, without the same, or at any rate as great an, increasing tendency in the cost. Care is, however, necessary in the selection of the age of deferment for several fairly obvious reasons.

There is yet a third basis, under which the future- and past-service pensions are combined, and a fixed annual payment—or a fixed percentage of salaries—is paid by the employer, such payments being used on the lines of the past-service indefinite funding method, but for the total pension from the oldest employee downwards. Naturally this basis holds great attractions to many employers for its apparent simplicity, and indication of future annual commitments. In fixing the amount of the annual payment regard is paid to the probable requirements for many years to come, and the adequacy of the amount is reconsidered every few years, but nevertheless, in my opinion, this basis is not usually advisable, as the dangers inherent are such that they are only likely to be realized thoroughly by actuaries.

Death benefit. The majority of group schemes include a group-life benefit, of an amount approximating to one year's salary (sometimes less for females and sometimes doubled for married males and for widowers with children) and this is almost invariably paid for entirely by the employer on a 'single-premium' basis. Any increase in cost is of no importance, as the cost of this benefit is but a small proportion of the total cost of the scheme, and the 'single-premium' basis involves no overpayment for lives who subsequently withdraw. A level-premium basis is occasionally used for very small cases but no surrender values are allowed on withdrawal. The group life part of the scheme includes a total and permanent disability benefit (of little value and really better omitted as it is likely to create disputes) and an option on withdrawal to effect an ordinary life policy without evidence of health (valuable in sub-normal health withdrawals). If either of these features is omitted, the premium is reduced by 5% (10% if both omitted). Provision is also made whereby employees temporarily absent from active employment, owing to illness or slackness of trade, are kept covered (even if technically discharged to avoid any liability for payment of wages) so that such temporary absences do not create breaks in membership. It may be necessary in such cases to allow the member's own contributions to fall into arrear during absence, and the arrears are gradually paid off after return to work, or are remitted and the pension reduced accordingly.

Various other incidental benefits are included in these schemes, such as early retirement on immediate pension at any time within a few years of pension age, postponement of pension on late retirement, exchange of normal pension for one of reduced amount, part or the whole of which continues after the member's death to his widow or other named dependent, and paid-up pensions on withdrawal with the right to continue contributions direct to the assurance company.

The general handling of the scheme is considerably simplified if new entrants and grade changes are restricted to scheme anniversaries, the benefits for any year being determined at the beginning of that year according to current salaries. Similarly, if premiums are paid monthly, as is frequently the case, no alteration need be made in the monthly premiums on account of deaths and withdrawals until the end of the year when all adjustments are made in one sum.

TAX ALLOWANCES ON CONTRIBUTIONS

Employers and employees are entitled to certain tax concessions in respect of contributions, provided the scheme is approved as a *bona fide* pension scheme by the Inland Revenue authorities. Each case is referred to Somerset House, and certain principles must be observed if approval is to be obtained. Experience alone can show all the pitfalls to be avoided, but broadly speaking the scheme should

(1) show provision of pensions to be the main object,

(2) provide for retirement from service when pension is received,

(3) avoid giving either to employees or to employers a right to the refund of the employers' contributions on withdrawal in *all* circumstances,

(4) set out reasonable limitations of individual variations, if any, of scheduled benefits,

(5) apply either to all permanent employees or all employees in clearly defined categories, and

(6) exclude partners or directors not holding salaried appointments.

The scheme may be approved under Sect. 32 of the Finance Act, 1921, or under Sect. 32 of the Income Tax Act, 1918. In either case the employer is allowed to treat his total contributions as a trading expense for Income Tax and, if liable to Excess Profits Tax, all his contributions except those for additional pensions for past service are allowed against this tax. This assumes that the scheme is a normal one and may be subject to special treatment for contributions in respect of salaried directors. Under the 1918 Act schemes the funding period for past-service pensions must be at least 10 years, as the cost is allowed only in so far as it can be classed as an annual commitment, but under the 1921 Act the period of the spread is at the discretion of the Inland Revenue authorities.

The treatment of the employees' contributions differs according to which Act is selected. Under the 1921 Act the contributions are allowed as an expense, thus earning rebate at the actual rate of tax paid, subject to adjustment of the earned income allowance, but carry a liability to tax at one-quarter of the standard rate on refunds on withdrawal. Under the 1918 Act rebate is allowed as a life assurance premium (at present at 3*s*. 6*d*. in the £) with no adjustment of the earned income allowance and no liability for tax on refunds. For females and lower paid males the 1918 Act is usually adopted, but the 1921 Act is better for administrative employee schemes.

When the pension becomes payable, 1918 schemes require treatment as annuities payable subject to full deduction of tax at source (except with DR or DX forms), whilst 1921 schemes require treatment as salaries and payment in full or deduction of correct tax. In either case the pension ranks as earned income.

BASIS OF RATES

At the moment, owing to the war, we are in the midst temporarily of unusual financial conditions in which offices are doing their best to support the Government's desire for low interest rates. The rates now being charged are, therefore, of purely present importance, and as the post-war level is rather a matter of guesswork, I propose to look at the matter from the point of view of 1938–9. The small but growing number of offices handling the business charge rates on bases agreed between them from time to time.

The basis of the group-life benefit premiums has not changed for many years and is $1 \cdot 1q + \cdot 00125$ by the English Life Table No. 9. This premium includes the 10% previously mentioned to cover disability benefit and withdrawal option.

The mortality tables used in calculating the pension rates are A 1924–29 Ultimate and $a(f)$ and $a(m)$ Ultimate before and after pension age respectively. The present rates are all based on 3% interest with a 5% loading throughout on the net premium, but the basis of the rates used in 1938–9 was $3\frac{1}{2}$% interest with the loading of 5% only on that part of the premium paid by the employer, i.e. the premiums not returnable on death, the net premium having first been increased by 1%–4% according to the pension age because it was thought that the A 1924–29 mortality was rather heavy at the older ages.

It is not very easy to see what the combined charge for the benefits included as a provision for expenses, etc., on the 1938 basis. Substantially the intention was to throw most of the loading for expenses and profit on to the premiums for the group-life benefit, although the employers' contributions to pension also contained a small loading.

I think, however, that a better picture would be obtained by comparing the total charge with the sum of the net premiums for all the benefits, and for this purpose as an example I have taken employees of various ages contributing at the rate of 1*s.* 3*d.* per week, returnable without interest on death or on withdrawal, to a scheme providing at age 65 a pension of £1 per annum for each year's membership, with a minimum pension of £26 per annum, coupled with a group-life benefit of £100 on death before pension age. I have omitted for simplicity the disability benefit frequently included in these schemes, but this should not affect the position greatly one way or the other. The employer, as is usual, pays the balance of the cost of the pension, after allowing for the stated employees' contributions, on a 'non-return' basis, and also pays for the group-life benefit. All premiums are based on the level-premium method to give a true picture of the position throughout an employee's membership, but substantially the same position would be obtained on the 'current-cost' method with funding arrangements for the additional pension, although certain incidental profits (or losses through depreciation) on withdrawal, etc., vary according to the method used. These profits cannot be allowed for in calculating the premiums, but they are not very important and to some extent can be set against the expense involved in handling withdrawals.

To calculate the net premiums, assumptions have to be made as to the rates of interest and mortality before and after pension age. As regards interest, it must be remembered that we are dealing with very long-term contracts for guaranteed benefits, and that the past and present may not provide reliable guides to the future. Even a rise in the rate of interest is not an unmixed blessing, as it is almost invariably accompanied by depreciation of capital. On the other hand, under present laws, annuity funds are taxed, broadly speaking, on profits and not on interest income, so that I think a rate of $3\frac{1}{2}\%$ per annum would have been reasonable. Mortality is also a problem, as we are dealing with varied classes of lives. The decision is, perhaps, rendered easier because before pension age we have counteracting effects from the group-life death benefits and the non-returnable employer's pension premiums. From some data I have examined I find that the actual deaths over some years agree fairly closely with those expected by the A 1924–29 Ultimate mortality table, and this table has been used up to pension age in calculating the net premiums.

For ages after 65, the experience is rather young yet to provide any guide, particularly as the possible effect of the inferior lives taking advantage of widows' pension options has not yet been felt. I do not think that the A 1924–29 table is suitable after pension age, and the $a\,(f)$ and $a\,(m)$ table has therefore been used. Whether or not this is too light for pensions under schemes such as this, time alone will show.

On this basis the premiums charged for the benefits stated above provide an over-all loading varying from 10 % at the younger ages to 8½ % at the older ages. Alternatively, it could be expressed as 7½ % plus 2*s.* 6*d.* per annum. This loading has to cover the expenses of handling the business (including advice in the setting up of the scheme and help in explaining it to the employees), commission and investment expenses, apart from profit and a margin for contingencies. A very small reduction in the rate of interest earned would soon nullify much of this allowance (a reduction of ½ % p.a. would cancel the loading), whilst any substantial increase in the rate of interest in the future might result merely in the threatened loss of the future contributions under the scheme to another office then offering better terms because of the increased rate of interest. In other words, the premiums have to provide a guarantee by the office that it will stand by its obligations even if future conditions result in a loss, without any corresponding certainty that if conditions go the other way, the office can rely upon receiving the extra profit.

OFFICE VALUATION

The valuation of group-pension business has introduced a number of new problems involving, as it does, large numbers of small units constantly changing. At first actuaries seem to have postponed the task of installing new methods of valuation and to have contented themselves with a rough approximation to the true liability by accumulating the premiums received less payments made at a rate of interest less than the earned rate but higher than the normal annuity valuation rate. As the business in force has grown the need for a more accurate valuation of the liabilities has become more pressing and offices have gradually evolved their own methods. I had hoped to be able to study closely the methods ously impracticable to record the future premiums of each life and value these varying premiums if the business is merely grouped according to pension year. There are two alternatives from which to choose:

(1) To value pension purchased by premiums already paid and ignore future premiums and benefits, a method which seems unobjectionable provided business has at no time been written on terms likely now to cause a loss, or

(2) To value each scheme separately by reference to a table of calculated reserves age by age per unit of pension, somewhat on the lines of industrial assurance valuations.

The first method is the simpler, and if considered dangerous on account of schemes arranged in the past on unprofitable bases, it can be modified by the calculation of a table of additional reserves at each age attained for each unit of pension under such schemes. This is rendered possible by the fact that except at young ages the employer's cost is independent of entry age. The modification will naturally apply to a small proportion of the business on the books almost in the nature of a closed fund, and might even be dealt with by means of a special reserve, decreasing as the business concerned grows older and not requiring annual valuations.

The main valuation should be separated into two groups:

(1) Young employees where the employer has not yet commenced to contribute;

(2) Other employees.

For the general purposes of the pensions department a card will be available showing for each employee:

(*a*) Employer.
(*b*) Employee.
(*c*) Date of birth.
(*d*) Date of entry into scheme.
(*e*) Date of retirement.
(*f*) Date of commencing service.
(*g*) Employee's contribution rate per week.
(*h*) Pension per year of future service.
(*j*) Future-service pension.
(*k*) Group-life benefit.
(*l*) Past-service pension.
(*m*) Single premium for (*l*).

Items (*g*), (*h*), (*j*) and (*k*) will vary from time to time in most schemes owing to salary changes.

These cards are kept in alphabetical order in schemes and are used for purposes of calculation of premium cost, withdrawal refunds, etc.

For valuation purposes additional information is required, and it is preferable to have separate cards filed under group years (calendar year of retirement) and showing in addition to items (*a*), (*b*), (*c*) and (*l*) above,

$c = (g)$ above per annum.
$mc =$ total employee's contributions from entry to pension age.
$p = (h)$ above.
$mp = (j)$ above.

These cards are filed in the two separate groups (1) and (2) mentioned above in addition to separation by colour of cards, according to sex and pension age.

Group (2) cases are valued by a formula of the type

$$(\Sigma mp - n\Sigma p)\, \bar{a}'_y \cdot \frac{D_y}{D_x} + (\Sigma mc - n\Sigma c)\, A^{\;1}_{x:\overline{n+\frac{1}{2}}|}.$$

Group (1) cases can be valued retrospectively by a formula involving $s_{\overline{t}|}$ functions (complicated when grade changes have taken place) or prospectively by tabulating on the card a special item $mca = c$ accumulated to pension age with interest at the valuation rate and then valuing by a formula of the type $\Sigma mca \,.\, v^{n+\frac{1}{2}} - \Sigma c \,.\, \bar{a}_{\overline{n}|}$.

It will usually be found in practice that individual reserves under bases (1) and (2) do not differ widely at date of change of class, but when this is not the case, allowance must be made for this point in the analysis of profits, or the rate of interest used in the accumulation could be fixed at, say, $\frac{1}{4}\%$ higher than the normal valuation rate as an approximation to the correct accumulation which would be with interest and mortality less cost of return of premiums without interest on death.

There is an alternative method of valuing class (1) cases recently devised by my colleague Mr F. W. Sawkins, B.Sc., F.I.A. This method is based on the fact that the pension purchased from year to year by the employee's contributions can be represented almost exactly by values in geometrical progression with a common ratio equal to $(1 + i + \cdot 005)$, where i is the rate of interest used in calculating the premiums.

Given a common ratio, r, the pension purchased to date at any time can be calculated if the card records two functions, P_{64}, the pension purchased by the employee's contributions in the last year before pension age (the last year is chosen, not the year of entry, in order to reduce the figures for working purposes) and a function of P_{64} based on the age at entry. The cards being grouped according to year of pension age, the amount of paid-up pension at valuation age $(x-\frac{1}{2})$ for a member who entered the scheme at age z will be

$$p\,[(P_z+P_{z+1}+\ \dots\ +P_{64})-(P_x+P_{x+1}+\ \dots\ +P_{64})]$$

$$=p\left[P_{64}\,\frac{r^{65-z}-1}{r-1}-P_{64}\,\frac{r^{65-x}-1}{r-1}\right]$$

$$=p\,.\,P_{64}\,(s^{\,r}_{\overline{65-z}|}-s^{\,r}_{\overline{65-x}|}).$$

It will be seen that $p\,.\,P_{64}$ and $p\,.\,P_{64}\,.\,s^{\,r}_{\overline{65-z}|}$ are constants for each case and can be recorded on the card.

As premium rates have varied from time to time the common ratio will also vary, but in practice, with a mixture of business at various rates and with a modification of the method whereby a *theoretical* value of P_{64} is calculated, the use of one common ratio would only introduce at the present time a slight error, probably on the safe side.

The amount of paid-up pensions having been calculated in each group by this formula the reserve can then be calculated with a formula similar to that used for group (2) cases. This method enables group (1) and group (2) cases to be merged if desired by recording on group (1) cards the two constants mentioned but not recording p or mp. Care is necessary, however, to see that any past-service pensions in group (1) cases are brought into the valuation.

Finally, whichever valuation formulae are used, allowance may have to be made for the incidence of premium income if, as is possible, the business tends to fall heavily in the first six months of the year. This point can be examined every few years and appropriate adjustments made to the reserves in total.

ABSTRACT OF THE DISCUSSION

Mr J. H. Kitton in opening the discussion said that although short papers on group life and pension schemes had appeared in the Students' Society and International Congress literature the author was to be congratulated on being the first to submit a paper on the subject to the Institute, and on having condensed much useful information into a short space.

He felt that there were several points which might have been more elaborated, as was perhaps inevitable with any first paper on a wide subject. One point was the rising cost tendency of the usual method—the current-cost method—which the author admittedly had dealt with at some length. That particular feature was probably the most essential difference between group schemes and the older type of scheme, based on individual policies subject to level annual premiums, under which employer and employee usually shared the cost on a fixed ratio throughout. The feature was probably, therefore, the one which would give rise to most criticism. Most of the other differences were mechanical, and he did not think anyone who had experience of group schemes would criticize them from a practical point of view.

To appreciate the significance of the rising cost feature, it was helpful to take the hypothetical case of a staff which had reached a stationary condition both in respect of salary distribution and age distribution. In such a staff the future-service pension benefits for any particular year of service would be the same as the future-service pension benefits for any other year because, by hypothesis, the salary distribution was constant; the cost of such benefits would also be constant from year to year because the age distribution was assumed constant. Therefore if a group scheme based on single premiums or current cost were applied to a stationary community, the effect would be—ignoring any complexity due to the over-sufficiency of the contributions from some employees at the earliest ages—to stabilize from the outset the cost of future-service benefits at a figure which would neither rise nor fall.

For such a community a level annual premium scheme, either of the present group type or the older type, would involve quite a high commencing annual cost which would steadily fall for many years until it eventually became stabilized at a figure lower than under the single-premium plan, because of the interest earned on the higher reserves set up in the earlier years. That could be appreciated by considering the cost of a £10 pension—equivalent for example to the unit pension from age 55 to age 65. The cost on the basis of the annual premium at age 55 was about £9 per annum, whereas on the basis of the annual premium at age 20 the cost was approximately £1 per annum.

Thus the single-premium plan resulted in a fairer distribution of cost from generation to generation, whereas the level-premium plan taxed the immediate generation in order to produce a somewhat lower cost for future generations.

Staffs met with in practice had not as a rule reached a stationary position, and so the single-premium plan gave rise to a rising cost for the employer. As the author had pointed out, however, it was that feature which enabled employers to contemplate schemes involving substantial back-service element. The level-premium plan, incorporating as it did the higher initial cost of future-service benefits, tended to cause the inauguration of schemes in which the back-service element was small, resulting in a penalization of immediate employees for the benefit of future employees. Care was required, however, and he thought the criterion on which to judge when to use the single-premium plan was the departure of a staff from the stationary position. He agreed with the author that it should not be used for small staffs subject to wide fluctuations, nor for new and rapidly expanding staffs in which employees of older age were unduly scarce.

It was worth noting that an indefinite cost to the employer under pension schemes was not new. It was to be seen in the ordinary private fund when the employer guaranteed a rate of interest, often on a fairly optimistic scale. In insurance schemes the insurance companies guaranteed the rate of interest while the employer accepted the more measurable feature of rising cost.

The author had mentioned the 1921 Finance Act and the 1918 Income Tax Act under which the schemes were usually arranged, and had indicated the difference between the two as far as tax concessions were concerned. From the insurance company's point of view there was a rather important difference on the legal side. To any such schemes there were three parties—employer, employees, and the insurance company—and he had always understood that, whenever possible, a triangular tangle should be avoided. Under a 1918 Act scheme the policy was usually effected by the employer, or possibly by trustees, as grantee, but there was no fund. Under the 1921 Act scheme, for the purpose of approval there had to be a fund, which required a full set of rules to govern and define the claims of the employee members on the fund, any insurance policy effected being merely a reassurance of benefits. If a set of rules existed in connexion with a scheme, any dispute arising between employer and employee would probably be settled according to those rules. If there were also a complicated policy on the basis of which any dispute between the employer and the insurance company must be settled, it was essential that the policy should support the rules, a matter on which particular care must be taken. Under the 1918 Act a scheme could be arranged by the employer effecting the policy as grantee, a descriptive booklet taking the place of rules, such booklet indicating the policy as the basis of the scheme and giving the employees the right to inspect the policy at any suitable place and time.

His next point was on valuation. The author had dealt with valuation of the pension part of the schemes in some detail, but he had not said much about the group-life part. The group-life part was the 'swings' to the pension 'roundabouts'. The profit on one might make up for the loss on the other. In a new scheme it would be a long time before the pension experience became known. If therefore there was a profit from the group-life part it was important that some of that profit should be conserved to support the pension side. A strong valuation basis for the pension part would automatically absorb some profit from the group-life part if the two were valued in the same fund, but the position would need watching if the two were in different funds, of which the surpluses went in different directions. If the group-life part was throwing up profit in the life fund and the pension part, owing to a strong valuation basis, was absorbing profit from the remainder of the annuity fund, an unfair position might result.

There was another small valuation point, again relating to group-life policies which frequently contained a continuation option—the option to an employee leaving a scheme to effect a new policy at ordinary rates. It was generally agreed that those employees who did effect such policies were not good lives, and so when such a policy was set up it should carry with it some reserve to make up for lack of extra premium, and some portion of the premiums collected under group-life policies should be reserved for that purpose.

One point—which might be quite important—on which nothing had been said was the underwriting. The group-life part of a scheme was a small part of the whole. In the earlier years, however, there would not be much offset arising from the non-return character of some of the pension rates, particularly if the back-service element should be small. Therefore, careful underwriting was just as necessary for a group-life and pension scheme as it was for group-life policies, and he did not think that the association of pensions with group life should necessarily permit the writing of a scheme for quite a small staff without some sound evidence of health.

One point regarding stamp duty might be worth mentioning. Receipts for pensions given under a scheme were generally exempt from duty if the employer were a contributor on a substantial scale and the main object of the scheme were pensions. The same was true of receipts for death benefits, whether paid in lump sums or by level payments in substitution of lump sums.

With regard to rates of premium, it seemed to him that the author had dismissed a little lightly the basis now in use. There were several points to bear in mind with regard to that matter. First, there was the long-term character of the contracts. Secondly, it must not be overlooked that for a period of 5 years the same rate basis was generally guaranteed for all entrants, and, what was much more important, for all future increments in respect of those entrants. Therefore, not only were the contracts of a long-term character, but they were increasing premium contracts in which the weight of the premiums would be received in later years. Thirdly, there was the mortality of pensioners. The type of annuitant mortality resulting from group schemes might be different from the experience of male annuitants, but he would draw the attention of members to the note in Vol. LXXI of the *Journal* (p. 280) on male annuitant mortality. That mortality was still improving. The fourth point—and a very important one—was the rate of interest: would it rise in the future to the kind of rate known in the past, or would it stay where it was, or fall still further? No one could foretell. Also, a change in the basis of taxation of annuity funds could not be ruled out as an entire impossibility. A fifth point was that in such a type of business no one wanted to be niggardly in respect of small points, and consequently some elbow room in the rates was very useful. Pension schemes were becoming more numerous. By underwriting them the offices were, he supposed, becoming an even more vital part of the social structure of the country, and because of the points he had mentioned he thought it very important that they should not allow themselves at any time to be jockeyed by any kind of competition into a hasty return to rates based on an optimistic forecast of the rate of interest.

Mr E. W. Ralfs said that the author had referred to the principle of a fixed ratio between each employee's rate of contribution and his rate of pension per year of service. Sometimes a lower rate of contribution per £ of pension was arranged for employees in the lower grades as compared with the rate fixed for employees in the higher grades. It might be argued that not only were employees in the lower grades less able to bear the same rate of contribution, but also, to the extent that it might be assumed that employees in the lower grades were younger than those in the higher, their contributions would purchase a larger proportion of their pension than in the case of other grades.

The author had suggested that the third basis, under which future- and past-service pensions were combined, and a fixed annual payment paid by the employer, was not usually advisable, and the speaker fully agreed. The author said that under such a method the annual payment was reconsidered every few years. In arranging pension schemes it was necessary to visualize the possibility of a change in the financial position of the employer, and if an increased annual payment were found to be necessary which the employer was unable to meet the position would be very unsatisfactory. The extreme case of an employer being unable to make any further contributions would mean that one section of his employees would have full pension—say all those over 50—while all those under 50, some of whom might have given equally long service, would not be entitled to any pension.

He was interested to note that the author considered that disability benefit under a group-life policy was better omitted. He agreed that it was apt to cause difficulty. In view of the very small additional premium received for the benefit, it was not possible to be as generous as was sometimes expected in the interpretation of the clause.

One point regarding the joint-life option sometimes overlooked by employers and employees was that on the death of a male pensioner leaving a widow, death duty was payable in respect of the value of the pension to the widow. The payment of such duty might cause hardship to the widow unless there were other funds available to pay the duty.

The author had given the conditions necessary for obtaining income-tax allowances. With regard to No. 2, 'provide for retirement from service when pension is received', it might be mentioned that in respect of one scheme the Inland Revenue made a concession and agreed that the treatment of the scheme for income-tax purposes would not be prejudiced if the Insurance company and the employer waived during the present emergency the enforcement of the rule against payment of pension to employees who remained in employment. They stipulated, however, that there should be no actual alteration in the rules.

As regards the rates, it was interesting to note that the premiums at present being charged allowed for expenses, including commission, of an amount varying from 10% to 8½%. That seemed a moderate allowance considering that the schemes entailed in their initiation a large amount of technical work, and employers expected a great deal of assistance from the offices in arranging the distribution of literature and generally in 'selling' the scheme to the employees.

Mr P. C. Reynolds said that the author had covered a very wide subject and had dealt with it succinctly, but his brevity might cause some important points to be missed. Those students who were new to the subject would do well, in addition to studying the paper, to get the rules of a particular scheme and go through them, because then there was less danger of their knowing a little of everything and not much of anything.

The theory of group pensions from some points of view was relatively simple, but the practical aspect of it was another matter, because, as many of them knew, the problems of no two employers were quite alike, and every scheme had some little difference.

He would suggest that at the end of the paper the benefits of a specimen scheme might be included, together with the premium formulae and perhaps an abstract from a balance table, which was the working tool of the actuary who was making the calculation for such schemes.

In the 'benefits' would be shown certain features which were not included in the paper but which were of some practical importance. For example, the pension scale as a rule for clerical employees was stepped up in the higher grades so that an employee who received rises of pay perhaps relatively late in life might have a pension which bore some reasonable relation to his final salary.

The formulae were quite simple but contained certain features of which the student might be ignorant. For example, the formulae for premiums returnable with interest were based on interest only, although at one time that was not the case. When rates for such schemes were based on 4¼% interest—it seemed a long time ago—and the returns to the employees were at 3%, it was the practice to allow for that in the premium calculations. Another item which might be shown with the formulae was the surrender value of the employer's contributions allowed to an employee leaving in good health. The present practice was to allow 90% of the contributions with 2½% interest.

One value of showing balance tables would be to make people realize how much work was involved in the calculations for pension schemes, and that had some bearing on the number of occasions on which an office was prepared to change its rates.

Reference was made in the paper to past-service or additional pensions. The second method of funding mentioned by the author—under which past-service pensions were bought outright and then funded (usually over a period of twenty years)—had fallen largely into disuse. It had one practical disadvantage, that if an employee died before pension age or even withdrew in ill-health, the employer had to continue the contributions for that employee for the balance of the twenty years. That risk was, of course, explained when a scheme was inaugurated, but some employers had defective memories.

On the subject of future cost, records had been kept of the cost of schemes running for ten years, and, in the records of one office at least, in no case had the cost risen as much as estimated, and in most cases it had not risen at all. Of course, the fault was in the method of estimation. In making estimates of future cost, it was the practice to ignore deaths and withdrawals and to assume that retirements took place only at normal pension age, the retiring employees being then replaced by new entrants in the lowest grade. Also it was generally assumed in estimating that no changes in salary grades could take place. Thus the cost was greatly over-estimated, at any rate in all the schemes with which the speaker had been concerned. If 'single-premium' quotations were restricted to at least 100 lives, and the age distribution were representative, then not only was the 'single-premium' method safe, but it was desirable, because it enabled schemes to be established in many cases where another basis would be prohibitive. The employer starting a scheme was chiefly concerned with employees near the pension age for whom the commencing cost would otherwise often be too high.

The author had been bold enough to tackle the question of income tax. He had even disposed of the subject on one page. To his list of six items, which should be observed if the scheme was to be approved as a *bona fide* pension scheme by the Inland Revenue authorities, he would add a seventh, 'No cash option is allowed save in exceptional circumstances' (which was a practical point), and an eighth, 'The winding-up clause must make it clear that there can be no refund to the employer'.

On item No. 3, 'Withdrawals', as he understood it, the Inland Revenue attitude was based on the view that if an employee withdrew voluntarily he could not be entitled to a return of the employer's contributions, because he would have such control over the money that in fact it amounted to deferred pay and therefore should be liable to tax.

On the other hand, the employer must not be able to control the money forthcoming on withdrawals, and, for example, get it back by dismissing the employee on account of bad trade. Thus there was no return to the employee in the event of voluntary withdrawal, and no return to the employer in the event of dismissal owing to bad trade. Throughout his remarks he was referring only to employer's contributions; the employee's own contributions were of course always returned to him on withdrawal.

The fears of the Inland Revenue might appear to be somewhat far-fetched, but it must be borne in mind that they had to deal with all types of so-called employers, including one-man companies who might have relations as directors or employees, and who might in some cases be out to find any loophole in the law. The regulations therefore had to be 'knave-proof'.

The Inland Revenue attitude was also coloured by the fact that withdrawal payments to an employee, if made, were free of tax under the 1918 Act schemes; and as the contributions had escaped tax, at the time they were paid, it meant that no tax had been paid at all. Therefore withdrawal payments were particularly watched.

That brought him to the 1921 Act, which was a wide subject. The author had pointed out the principal difference between the two Acts, but employers sometimes wanted to know whether it was possible for them to decide by a stroke of the pen whether a scheme should be under the 1921 Act or the 1918 Act. There was one material difference: it affected the employee's withdrawal payments. Under the 1921 Act there could be no cash refund to the employee at all in respect of the employer's contributions; if there was any allowance to an employee it must be granted in the form of paid-up pension. If it did not go to the employee in that form it must remain in the fund. He believed the employer might possibly be allowed to set it off against his next year's contribution, but that was the furthest to which the Inland Revenue would go; the employer could not take it in cash.

As regards the interest basis of rates, in 10 years reductions from $4\frac{1}{2}$% had been made in five stages, he thought, to 3%. There were three practical considerations affecting the offices when they had to decide the rates to be adopted. The first was that any change of rates would probably affect existing schemes. Existing schemes had the rates guaranteed throughout their period of service for new entrants joining in the first 5 years. That meant that at the end of 5 years any new rates would come into operation, and so on after a further 5 years; and the offices did not want to have too many tables of rates operating in the same scheme if they could avoid it.

Another practical consideration affecting the basis of rates was the work involved in calculating the balance tables. That might seem a small point, but in practice it was important. The tables usually had to be worked out for three different pension ages (55, 60, and 65), for males and for females, for annual premium and single premium, and for returns with and without interest. A practical course sometimes adopted when it was found inevitable to make a change was to make an approximate adjustment to the rates, *e.g.* instead of altering the interest basis, to make a percentage addition or else to make a level addition, such as increasing the rates by 0·2 per £ of pension instead of making an adjustment of $\frac{1}{4}$% in interest.

Another factor was that in view of the rate agreement it was advisable to endeavour to fix rates which would be agreed by all the offices interested, and therefore any formula should be as simple as possible.

Mr F. W. Sawkins wished to amplify a little the method of valuation given in the paper for current-cost class (1) cases, i.e. those cases where the employer had not yet begun to contribute. The paper explained the basis of the method given a common ratio r and also mentioned that in practice, owing to a mixture of business at different rates of premium, it would be necessary to use a theoretical value of P_{64} based on an appropriate common ratio according to the relative amounts of business at different rates.

In practice, even if all the business had been written at the same rates the pensions purchased would not be exactly in geometrical progression, and therefore the use of the actual value of P_{64} would involve an error of perhaps 2–3%. That error was avoided, however, by using a theoretical value of P_{64} obtained by treating the employee's contributions as being paid continuously, and then, at the moment at which the employer was due to commence his contributions, the accrued pension was exactly equal to the complete number of years that the employee had been contributing.

If m equalled the number of years' contributions payable by the employee and t the number payable by the employer, and $1-k$ the fraction of a normal year's contribution payable by the employer in the first year in which he paid, which in practice could be taken as $\frac{1}{2}$, then the employer commenced contributing after $m-t+k$ years, and equating the accrued pension to that derived by the formula $P_m(s_{\overline{m}|}-s_{\overline{t-k}|})$, where P_m was the theoretical value of P_{64}, the resulting equation was

$$P_m=(m-t+k)/(s_{\overline{m}|}-s_{\overline{t-k}|}).$$

The accrued pension by the formula would then be correct at the time of entry and again when the employer commenced contributions. P_m would be found to be nearly constant for different ages at entry, and an average value could be used, or a table prepared for different ages at entry; alternatively if m and t were known, the above formula could be used directly, taking k as $\frac{1}{2}$.

When there was a mixture of rates requiring different values of r it became necessary to decide on a suitable common value. The use of too large a value of r overstated the pension and vice versa. For example, on current rates for which r should be $3\frac{1}{2}$%, the use of 4% overstated the pension for a life aged 20 at entry paying 1*s*. 3*d*. per week to 65 (a fairly extreme case) by 4% in the first year, 1·8% after 9 years, and zero after 17 years when the employer first contributed. For a similar life aged 24 at entry the percentages were reduced to 2% in the first year, 1% after 5 years, and zero after 9 years. It would be noticed that the percentages decreased as the accrued pension increased and the actual errors were zero at entry, rose to a maximum, and then fell again to zero. For the rates in force in 1938–9 based on $3\frac{1}{2}$% interest the best value of r was $4\frac{1}{16}$%, and, with a mixture of those and current rates and a constant new business, a value of r of 4% would probably be suitable at the present time. In deciding on an average value more weight must be given to the higher values of r, as the higher the value of r was the smaller would be the value of t, and the term $(m-t)$ would be larger. As a result more class (1) cases would occur, and larger errors would be made if an incorrect value were used with a consequent understatement should the average value be less than the true value.

Finally, taking the schemes as a whole, there would also be a large amount of business in class (2) so that any percentage error in the valuation of class (1) would be considerably reduced by the heavy reserves in the former.

It should be noticed that the value of r depended only on the rate of interest used in the premiums and was independent of the rate of interest used in the valuation, and that the method was very simple to use in practice.

Mr B. Robertson said that he recollected being in that hall twenty-seven years ago when a paper was read by two eminent members of the Institute, the paper concluding with a section on group insurance, which the authors described only to condemn rather severely. Another speaker, who had since been President, added his condemnation, and hoped that the system would never take root in England. It was, however, only fair to state that at that time group insurance linked with pensions was not contemplated.

There had been undoubtedly a change of heart among employers, causing them to think how good it would be to institute pension schemes for their staffs. That view was supported by two other causes. One was the persistence with which the advantages of pension schemes had been brought home to employers by Assurance companies, and the other was the cheapness, bearing in mind the tax concessions obtainable, with which schemes could be instituted.

He did not want to discuss the actual bases used in those schemes but would content himself with pointing out that the business was first written at a time when interest rates were high. Those rates had since shown a continuous descent, but he would hesitate to say whether they had yet reached bottom.

He felt strongly that each section of a pension scheme should stand on its own feet and that the sufficiency of the contributions or premiums for the scheme as a whole should not depend on the inclusion or non-inclusion of other sections.

As to the question of altering the premium rates for group life assurance it must be remembered that the evidence of health obtained was of the most meagre character. It was true that in the past the claim ratio had been light but that had, so far, been little affected by epidemics or catastrophes affecting large bodies of people, the cost of which would probably be heavier among bodies of people associated as members of pension schemes than among a similar number of unconnected individuals.

The method, which was sometimes defined as the funding method, and in which the employer was given to understand that for the first twenty years his contributions would not exceed a certain round sum, had great advantages, and while it was true that power must be taken to vary the annual costs if need arose, it was necessary to bear in mind the views of the Inland Revenue authorities, who did not like changes in schemes without very good cause.

An administrative difficulty might occur in the case of a man who reached pension age but deferred his retirement. It was unusual for him to be allowed, before actual retirement, to allocate part of his pension to his wife; and if he should die in service his wife's benefit would generally be very much restricted. If it were possible to arrange that, on his death in service after the normal retirement date, his wife would be entitled to a pension for life, there would be a great improvement on the present position.

Two ways of dealing with past service had been touched upon, and he wanted to mention the treatment of early retirement through ill-health. Under the definite funding plan the payments continued, unaffected by deaths, but it must always be remembered that the employer had the right at any time to stop contributing to the scheme. If a man retired early, was it possible to take into account the full pension he would have if he remained in service until the normal retiring date?

Coming to the 1918 and 1921 Acts, he could not help feeling that in the past employers must have been puzzled as to the respective advantages and disadvantages of a scheme under those Acts. In fact, in arranging a scheme to conform with one or the other, it looked as if the two methods were in competition. A scheme could, however, be devised to conform with the requirements of the 1921 Act, so that the maximum tax allowance was obtained, but securing at the same time the advantage of co-operation with a life office. It was true that a scheme under the 1921 Act involved two or three times as much work for the office concerned. The author had pointed out that the position of the life office in regard to that type of contract was rather one-sided. The life office could not terminate the scheme except under special conditions; the employer could cease contributing to it at any time. He knew an actual case where a scheme was started, the first contribution was paid, and then the managing director repudiated the action of the other director to whom he had delegated responsibility and the scheme came to an untimely end.

Under the 1921 Act basis the office had even less power to ensure that contributions under a scheme should continue to be paid to the office. In the case of a fund set up under a trust deed, the trustees' powers of investment could include power to invest in insurance contracts, and it was thus open for the trustees to make an arrangement with an Insurance Company to relieve them of all difficulties and risks attendant on ordinary forms of investment: on the other hand, the trustees could at any time decide to invest in Stock Exchange securities instead.

But such troubles, while real theoretically, had not in practice developed to any marked extent. To him it was rather agreeable to see the two methods, sometimes erroneously looked upon as rivals, coalescing to aim at producing a perfect scheme. The perfect scheme might be incapable of achievement because there were certain benefits which in group-pension schemes might not be possible, e.g. the benefit, dependent on length of service and attained salary, on early retirement through ill-health. He had always admired the skill of those who were able to devise scales of ill-health retirement rates, sometimes on very scanty data. Hitherto the data in connexion with group schemes had not permitted such a calculation, but perhaps as time went on it would be possible to collect data sufficient for the solution of that and other similar problems.

Mr J. Bacon said that the author had dealt with group-life and pension schemes from the angle of the office, but he thought, in view of some recent articles in the insurance press, that they might have been dealt with from the angle of the employer. That had not been done, and he hoped he would be in order if for a moment he dealt with that aspect of the case. He was not connected with an office issuing group-life and pension-fund business, and therefore he had been concerned only at two stages, the beginning and the end. In each case he had found considerable difficulty. He had been asked to advise as between competing offices, and his first difficulty was that it appeared that the schemes of no two offices were exactly alike, so that it was impossible to make comparison between them. That had now, he gathered, been changed.

His second difficulty was even greater, and that was that he could not see any compelling reason why a firm employing a large number of people and able to obtain competent financial advice should go to an office at all. It seemed to him that there was every reason why such a firm should run its own internal scheme and secure all the advantages and none of the disadvantages of going to an office. He was very doubtful indeed whether the type of scheme which was put forward by the offices was a suitable one in a case of fairly steeply increasing salaries with large increases at the later ages, and it seemed to him that any advantages that there might be in such schemes would be largely in respect of the manual grades or at any rate the lower salary grades, where the maximum salaries were attained at a comparatively early age.

In the early part of the paper the author had stressed the attractions of keeping down the initial cost, but in all fairness he should add that the author issued a warning later on as to the danger of that course. It was because employers had not been sufficiently warned or had not grasped the significance of the warning that he had sometimes been consulted at a later stage, when schemes had proved unsatisfactory, for advice on possible remedies, and he had found it practically impossible to rescue a firm that had once been caught. The administrative and financial difficulties of dropping an office scheme and substituting another, or setting up an internal scheme, or working the two together, were such that there were very few firms indeed that would face the upset and the difficulty. There would have to be some very special circumstances indeed which would induce a firm to make the change.

In view of the fact that the population generally was ageing, and that it was quite probable that the average age of employees would rise and equally probable that there might be some quite startling increases in the general standard of wages, the current-cost system, if applied to a case where there were a large number of young employees and where it was probable that as time went on the average age of those employees and the salaries would rise, did relieve the employer at the present time at the cost of a future generation either of employees or of shareholders. Although it had been said that it was only fair that the cost should be spread over the future to a large extent, because the cost in respect of people who were near the pension age would be high, those heavy costs were probably in respect of past service, and thus it was right that they should be borne in the present. There might be circumstances under which winding-up was inevitable, and a few people would get pensions and a great many would not. As an independent actuary he was all on the side of caution, and he felt that in any scheme provision should be made for the possibility that the scheme might have to be closed down and then there should be a fair deal all round. It was better to start with a less attractive scheme and to improve it later on than to give benefits some of which could not be maintained. In view of the great uncertainties with which they were faced, he felt that the current-cost was not a good method, and he was in favour of the level-premium method.

Reference had already been made to rising standards of payment and fluctuations of rates of interest. He had been looking at two or three samples of pensioners' mortality only that afternoon, and found that in certain of them the $a\,(f)$ and $a\,(m)$ table gave expected deaths which were in excess of the actual deaths and in other cases the reverse, and that led him to the suggestion that the table was probably a reasonable one to adopt at present for general use. The expense ratio of 8–10% arrived at by the author was a good deal more than most internal schemes cost.

It was true that, whilst the employer adopting an office scheme was temporarily safeguarded against loss from mortality or investments, taking the long view it was axiomatic that the offices would make the business pay by adjusting their rates, and he did not think that it would be easy for an employer to surmount that difficulty by closing down a scheme. The offices were either operating at a profit or a loss; if at a profit, and good financial advice was available, there was everything in favour of an employer running his own scheme, particularly as an internal scheme was far more flexible than any office contract that he had yet encountered; if at a loss, it was not fair to other policyholders or to shareholders.

He thought that there might be at any rate one method of meeting in part the criticisms that he had made. He suggested that sooner or later the offices might be compelled to issue such a type of contract with participation in profits, and offices transacting a substantial amount of the business might properly turn their attention to that aspect of the case, keeping group-life and pension-fund business in a separate compartment, and distributing profits on some sort of contribution method. That plan would not meet the criticism, however, that the schemes were largely inflexible, and taking that into account, with the relative cheapness of administration of internal schemes, he as an independent actuary could not see any reason whatever why any firm of reasonable size should go to an office for its pension scheme.

Mr H. P. Clay questioned Mr Bacon's assessment of all group schemes by his experience with regard to the very small percentage of such schemes which had come to his notice as a consulting actuary. The great majority of such schemes had functioned satisfactorily, and the variable nature of the cost from year to year was both understood and appreciated by the employer. The speaker thought that the author, in discussing the reasons for single-premium costing, had missed one point which had impressed the speaker very much in recent years. There were many employers who treated their staff admirably and yet had not established any form of funded pension scheme. Some of them had set up such schemes recently because they had surmounted a difficulty, not of money but of principle. Present shareholders were apt to say that they were saddled unfairly with actual payments to present pensioners who retired years ago, and to ask why they should also pay the full accruing cost for their present active employees, both as regards their current and past service. Payments to present pensioners could not be avoided, and therefore they proceeded as economically as they could with regard to present employees. He did not think that members of the Institute should lend themselves in that hall to any suggestion that if an employer could not pay the cost of an expensive scheme, actuaries should not co-operate to the best of their ability to produce as satisfactory a scheme as permitted by present circumstances.

Under the single-premium system, in present conditions, a male employee (due to retire at age 65 and contributing 1*s.* 3*d.* a week for each £1 annual pension accretion) bore the whole cost of his pension up to some age such as 26, and so the employer's cost was heaviest in respect of employees nearest retirement and so the least likely to leave service.

The schedule on page 376 was something to which he was bound to raise objection because it did not provide for any diminution of contribution of the lower-paid employee because of the Government Contributory Pension. The latter gave a basic pension of £26 a year to a man from age 65, with an equal amount in respect of his wife on reaching age 60, and for higher-paid employees the pension was relatively inconsiderable. It could be disregarded in the case of persons earning £500 a year, but not for persons earning £100 a year.

There were some occasions where an employee at the younger ages was probably of lower salary class, and therefore it might be desirable to charge not 1*s.* 3*d.* per week per £ of pension, but perhaps 1*s.*, but he would offer a caution against such discrimination in the same set of rules: where discrimination was desirable it should be between classes of employees and each class should have a separate rule book. It was not enough merely to be right; it was necessary to be obviously right in matters of staff welfare.

There was a fourth method of funding which was better than the third method mentioned by the author on page 379. It was one in which the fixed annual payment of the employer was applied in the first place on a single-premium basis to buy all the pension promised for the current year of service, and it was only the excess which was applied for past service for the people at the oldest ages.

His final point was connected with the 1918 and 1921 Acts. The Revenue did not 'approve' a scheme under the 1918 Act; the word was 'acknowledge', not 'approve'. It was therefore easier to use generally the word 'agree', which covered both 'approve' and 'acknowledge'. It would be possible to arrange a trust deed under the 1918 Act so that the benefit should be provided by a life office, which was done by saying 'the trustees *shall* invest'. That was the essential difference between the 1918 Act, under which the trustees '*must*' invest, and the 1921 Act, under which the trustees '*may*' invest with an office. He was glad some speakers had stressed the greater amount of work to the office necessary on its advisory side under the 1921 Act. Under the 1918 Act, the office was 'selling a contract'; he would not like to venture upon an exact description in words of what an office was doing with regard to a scheme to be approved under the 1921 Act.

Mr N. J. Carter called attention to the final paragraph of the paper. If it were found that the premium income departed materially from an even spread over the year it made a large financial difference in the case of a company transacting the business on a large scale. As an indication of the type and extent of the error, if the average renewal date were not 1 July but 1 May, in order to correct the error introduced into the value of the pensions on the one hand and the value of the premiums on the other, the valuation age being y, it was necessary to multiply by $D_y/D_{y+\frac{1}{6}}$ in each case.

He did not propose to discuss the correction for the value of the return of contributions, but the paper referred to the fact that most companies when dealing with the current cost did not value future premiums. If the pension purchased up to date were valued, it was still necessary to make a correction if the average renewal date was not 1 July, and it would be found that the value of pensions must be multiplied by $D_y/D_{y\pm k}$, where k was the difference between 1 July and the average renewal date, expressed as a fraction of a year.

Mr H. E. Raynes said that actuaries would recall, in looking back over the last twenty years, that at the commencement of that period life offices were transacting comparatively a small amount of pension business. The position had changed materially and offices were working extensively in the pension field, and although there was a certain amount of competition with internal funds, the offices administered now a very large number of pension schemes under contracts entered into since the last war.

The paper dealt with one type of scheme which large business firms took up. He did not know that the larger portion of the premium income received under those schemes came from the higher graded officials. Much of it covered ordinary industrial workers. Perhaps in numbers the industrial workers represented the major proportion of the membership. At the same time schemes did embrace the higher categories of salaried workers.

The type of scheme dealt with by the paper certainly had an American origin. In Britain group-life assurance by itself never made headway—but in association with pensions it was popular. The typical group-pension scheme was not transacted before 1928, and it was then introduced by an American company to give facilities in Britain for its existing connexions in the United States. Now the position was, he believed, that British offices transacted the business more successfully than did the American companies in the United States.

The discussion had centred round four points: group life, single-premium or current-cost method; comparison with internal funds; and, finally, mortality in respect of the pensioners themselves. For the life assurance benefits the premiums were rather high when actual mortality experienced was considered, but as had been observed some of the profit obtained from the group-life business helped to set up the stringent reserves required for the pension section of the business.

On the single-premium or current-cost method one point had not been sufficiently made that evening, namely, that it enabled the employer to take some benefit from the withdrawal rate which actuaries could take into account in estimating the contributions under an internal fund. By the current-cost method the premiums paid by a young employee covered the cost of the accruing pension without any charge on the employer. Little or no contribution was required, therefore, from the employer at those ages when the withdrawal rate was highest.

On the question of the rising cost it was right to point out that during the period when stabilization was being reached, perhaps over a term of twenty years, the past-service costs were paid by the employer, and when he had finished payment for those the cost of the scheme was probably on a stable basis.

He had found that the estimates of future costs made by quite a number of companies were on an erroneous basis, were certainly excessive, and bore no relation to the true facts. He had put forward an illustration of the ultimate cost for large schemes when the benefits were uniform, based on an age distribution similar to the population of Greater London as given at the census for the ages 20–65.

He did not want to enter into controversy with Mr Bacon. Rather would he leave it that there was room for both office and internal funds in the provision of pensions for employees. Each system had its merits. There was a guarantee given by the insurance company's contract, but, on the other hand, where there was profit to be made out of the scheme, the insurance company retained it at the present time, but any profit in the internal scheme would go back to the members. The controversy might be compared to a comparison of the merits of the mutual life office and the proprietary one. Each of them served their policyholders equitably and each secured a considerable amount of business.

As to mortality of pensioners he had been warned that the $a(f)$ and $a(m)$ table was not safe for estimates of mortality rates for a long time ahead. However, he thought premium rates were adequate for the purpose, judging from his experience of group schemes. In such schemes, already retired employees in receipt of pensions were numerous and from a group of such lives he had found that the mortality for the past 5 years had varied from 20 to 50% above that expected by the $a(f)$ and $a(m)$ Ultimate table. Most of the employees were male, and so far a profit had accrued from mortality of pensioners. He thought that it would be found that in course of time the mortality would tend towards that expected by the $a(f)$ and $a(m)$ table. At the present time he felt quite satisfied with the rates in force, that the business was on a sound basis, and that those who were transacting it were carrying out a work of some social benefit.

The President (Mr William Penman) said that he thought the author might well feel gratified at the number of people who had attended the meeting and at the full and interesting discussion which his paper had evoked. He hoped that the author, on that account, would feel that his labours had been amply rewarded.

He would like to stake out a priority claim, for having issued one or two group policies on the lives of employees as far back as 1914 or 1915. Those contracts were devised without any knowledge of the system of group insurance in America.

He did not like the 'current-cost' system, which was devised in America, at a time when staff conditions there were very different from what they were now in Great Britain. The part of the paper which had pleased him most, therefore, was the suggested modification under which a switch was made to the annual-premium system in the region of age 35. He thought that it was only with a modification of that description that the 'current-cost' system would stand the test of time.

He conveyed to Mr Simons, in the name of the meeting a hearty vote of thanks.

Mr A. G. Simons, in reply, said that he thought Mr Clay was right in emphasizing that it must be borne in mind that when an employer wished to start a pension scheme he had already a pension roll commitment and he would have to make past-service pension payments. If the future service were too burdensome in the early years the employer might be discouraged in the establishment of a scheme of any real value. It was of course desirable that the full cost should be met as early as possible, but an employer should not be discouraged by insistence on that course so long as one was sure that postponement of a part of the cost would result in a future-service cost that was not unreasonable. The past-service cost was frequently as large as the future-service cost and provided a margin against future increases. It was very unlikely that a current-cost scheme would be recommended if the future cost were likely to exceed twice the commencing amount.

Mr Kitton had asked whether a special reserve should be made when an option policy was taken under group-life assurance. A great deal depended upon the number of option policies which were taken. So far, he believed, the general experience had been that those policies were not numerous and could therefore be valued individually without difficulty, although the amount involved scarcely warranted that course. On the other hand, if there were a tendency to take more advantage of the option, there was always available the amount paid for the options on all group-life policies in the year in which the option was taken, namely, 5% of the group-life premium income.

Mr Kitton had also suggested that group-life profits should be used to strengthen the pension reserve where there were separate life and annuity funds, and presumably meant that if there were a profit on the group-life business there must be a loss on the pension contracts. That was not necessarily true because, as he had mentioned in the paper, the group-life rates were calculated on a much heavier mortality than the pension rates, and therefore with a profit on the group-life business it did not follow that there would be a loss on the pension contracts. He suggested that any profit made on the group-life business should be kept in the life fund for a period as a special reserve because so many of the group-life policies covered war risks and there was the possibility of heavy catastrophes. In the past it had not been necessary to use funds to meet such a catastrophe, but that did not mean that the need for a margin could be disregarded.

One or two speakers had referred to the definite and the indefinite method of charging for past-service pensions, and Mr Robertson had raised the question of early retirement. If the indefinite method had been adopted at any given date certain pensions had been purchased in full and all other pensions not purchased at all. Therefore, presumably, if a man retired early, he was either very lucky or very unlucky. On the other hand, in a fund established by the definite method, the only necessity was that sufficient money should be set aside to cover pensions for the people who had already retired. There was no need to set aside money for an employee who had not already retired except to the extent that the premiums still payable before he did retire might be insufficient. There was always a pool, which might be large or small, and if that pool was sufficient on the early retirement of an employee to purchase his past-service pension, and would be sufficient until the man would normally retire, there was no reason why that course should not be adopted. That was an advantage of the definite method compared with the indefinite. The pool was there to be drawn upon at will.

Referring to the definite method Mr Reynolds felt that it would be awkward to explain to an employer that when a man died the employer must still continue paying premiums for him. In actual practice, the premium for the past-service pension was not earmarked to individual employees and therefore the need for that explanation did not really arise. It could arise only in an extreme case where nearly all the employees died, but that might be ignored. In his experience there had not been any trouble in explaining to employers that the definite method allowed in advance for the expected number of deaths and that no reduction could be made in the premiums when an employee died, or when he became entitled to a paid-up pension on withdrawal owing to ill-health.

In reply to Mr Bacon concerning the relative merits of private funds and office schemes, he thought that office schemes had been justified by the fact that hundreds of funds had been established by that method, and would not otherwise have been in operation. Moreover, he would suggest that Mr Bacon had met his own criticism to some extent because he said that insurance companies would not transact the business unless they anticipated making a profit. Mr Bacon mentioned two cases, in one of which the pension mortality was lighter than expected, and in the other heavier. Surely one reason for insurance was that such was often the case—although an insurance company might make a profit on its total business it would not necessarily do so on any particular scheme. Fire and other insurances were effected for that reason, and even among pension schemes there were some which brought about a loss and others a profit.

Mr Bacon had mentioned that the current-cost scheme was unwise because of possible future changes in the standard of wages. Current-cost schemes, and in fact pension schemes generally, were usually worked on the basis of pensions for average salary, whereas private funds were usually worked on the basis of final salary and would be affected much more seriously by such changes.

Mr Bacon also mentioned that the private fund was more flexible, and instanced early retirement. Under any fund or scheme, if a man retired early a pension had to be provided and the money must come from somewhere. If too many early retirements were to take place in the case of a private fund the employer must foot the bill. Under an office scheme there was nothing to prevent an employer saying that any pension provided by contributions already made was insufficient and deciding to supplement that provision at his own expense. The advantage was that he knew the cost when making such a decision, and therefore was not likely to be unwisely or unduly generous.

A suggestion had been made that pension schemes might be undertaken on a with-profit basis, a thought that probably had occurred to many. The difficulty was, of course, that it would probably be very many years before anyone could say whether there was a profit or a loss on any given scheme or even on the business as a whole. Contracts were being dealt with which in some cases might run for 60 or 70 years, and in which so much depended on the mortality of the pensioners. It was almost impossible to put forward a suggestion to the employer that he should pay a higher premium in the hope that in 60 years' time it might be possible to distribute some form of profit.

Two speakers had suggested that modifications might be made in the schedule of benefits to allow for the existing national pension scheme and also for the fact that in the lower grades the employees were generally younger and less expensive. To introduce more than one rate of employees' contribution in a scheme, however, would add a tremendous complication which could not be appreciated by those with no experience of the effect of that course, and in his opinion it would be very unwise to do so. The remedy might be to divide the scheme into two parts as Mr Clay had suggested, but it must be remembered that the people in the lower grades were the work-people, who were not necessarily younger, or younger staff people who later on with increases of pay would be transferred to the higher grades, and, after all, it might not be unreasonable to charge them the same rate of contribution in the lower grades as in the higher.

Mr Clay had said that the main difference between the 1918 and 1921 Acts schemes was the question whether the trustees *should* invest or *might* invest. The real difference between 'should' and 'might' was explained by the fact that, if the Revenue knew that the trustees must insure, even in the case of a fund operating under the 1921 Act and approved by the Revenue as such, the employee would be allowed a rebate on the basis of the 1918 Act only, but nevertheless the fund could be approved under the 1921 Act if that were desired. On the other hand, if the Revenue could not say definitely that it was laid down that the scheme should be insured, then approval would be given under the 1921 Act and the rebate allowed to the employees on their contributions under that Act.

Quite a usual practice during the last year or so had been to arrange one scheme under the 1918 Act and another for the higher-paid officials under the 1921 Act. That was due to the fact that while a few years ago there was not much to choose between them, in the last year or two the 1921 Act had become more favourable and the 1918 Act relatively less favourable. How long that would continue no one could say, and he thought that it was unwise to encourage or even to allow an employer to switch from one Act to the other without warning him very seriously that in a few years' time he might find the position to be altered.

Editorial Note: The normal taxation position as regards contributions under a Life Assurance and/or Pension Scheme considered by the Inland Revenue Commissioners as satisfactory under the 1918 Income Tax Act, or a Superannuation Fund approved by them under the 1921 Finance Act appears to be at present as stated below:

(1) ORDINARY ANNUAL CONTRIBUTIONS				
	(*a*) In respect of future service		(*b*) In respect of past service	
	For schemes under the 1918 Act considered satisfactory by the Commissioners of Inland Revenue	For funds approved by the Commissioners of Inland Revenue under the 1921 Act	For schemes under the 1918 Act considered satisfactory by the Commissioners of Inland Revenue	For funds approved by the Commissioners of Inland Revenue under the 1921 Act
EMPLOYEE'S INCOME TAX	Remission of taxation at the rate applicable to premiums on currently effected life assurance policies and also on pure endowment and deferred annuity contracts where the scheme satisfies the proviso to Sect. 32(3) (*e*) Income Tax Act 1918	Full remission of taxation by treating the contribution as an expense in the employee's income tax return	As for future service	As for future service. (Instalments of a capital debt in respect of back service or arrears are not regarded as ordinary annual contributions)
EMPLOYER'S INCOME TAX (and N.D.C.)	Full remission of taxation	Full remission of taxation	As for future service. (For a scheme to be regarded as satisfactory, the cost of past-service benefits should be met by *either* (*a*) level annual contributions in each individual case spread over the future service of the individual employee, *or* (*b*) level annual spread of the total cost for all employees over a period of 11 years or more. Where (*a*) is adopted exception is normally taken to the inclusion of employees in whose cases the resulting spreading would be over a short period only, *e.g.* over less than 3 years)	As for future service (*i.e.* if reflected merely in increased ordinary annual contributions)
EMPLOYER'S EXCESS PROFITS TAX	Full remission of taxation	Full remission of taxation	At present no remission of taxation, but the question is now receiving consideration (see footnote) *	At present no remission of taxation, but the question is now receiving consideration (see footnote) *
(2) CONTRIBUTIONS OTHER THAN ORDINARY ANNUAL CONTRIBUTIONS				
	(*a*) In respect of future service		(*b*) In respect of past service	
	For schemes under the 1918 Act considered satisfactory by the Commissioners of Inland Revenue	For funds approved by the Commissioners of Inland Revenue under the 1921 Act	For schemes under the 1918 Act considered satisfactory by the Commissioners of Inland Revenue	For funds approved by the Commissioners of Inland Revenue under the 1921 Act
EMPLOYEE'S INCOME TAX	As for ordinary annual contributions (*vide supra*)	No remission of taxation	As for future service	No remission of taxation
EMPLOYER'S INCOME TAX (and N.D.C.)	No remission of taxation	Full remission of taxation, but allowance spread over such period as the Commissioners of Inland Revenue may determine; taxation remission is not necessarily allowed in the year or accounting period which includes the date upon which the payments are made	No remission of taxation	As for future service
EMPLOYER'S EXCESS PROFITS TAX	No remission of taxation	Normally as for income tax	At present no remission of taxation, but the question is now receiving consideration (see footnote) *	At present no remission of taxation, but the question is now receiving consideration (see footnote) *

Excess Profits Tax. In the cases marked * the deductions allowed for Income Tax should strictly be made, for Excess Profits Tax purposes, from the profits of the period to which they are reasonably and properly attributable. It is understood that where this would result in a reduction of the standard profits objection has not been taken to the elimination of these deductions from both standard and chargeable accounting periods but that the general practice in this connexion is under further consideration.

Directors. In the case of a company in which the directors as a body have a controlling interest, the Commissioners of Inland Revenue will not regard as satisfactory for Income Tax or Excess Profits Tax purposes a scheme in which any of the directors participate, even though the participating directors hold also other salaried position with the company, *e.g.* as managers, but an exception to this rule may be made in some cases in which the only participating directors are whole-time service directors with small shareholdings in the company (normally shareholdings not exceeding for the individual director 5 % of the issued ordinary capital). This note is also applicable to a fund.

The taxation position as regards *benefits* appears to be as follows:

(*a*) *Pension Benefit:* attracts full taxation in every case. The pension ranks as earned income only if the employer has contributed towards its provision, but even in this case it will *not* rank as earned income if the employer's contributions are treated as part of the employee's remuneration during his service. The pension will not be treated as earned income, whether provided by employer's or by employee's contributions, if the employee has an option to take a cash sum in lieu of pension at the pension age.

(*b*) *Withdrawal Benefit:* (i) Under present practice, in the case of the 1918 Act, any sums paid to the employee on withdrawal do not attract taxation. (ii) In schemes under the 1918 Act refunds to the employer are taxable as trading receipts. (iii) Under the 1921 Act any sums payable to the employee on withdrawal attract taxation (of the fund) at present at one-quarter of the standard rate, calculated on the amount paid. (iv) It is understood that during the currency of a fund approved under the 1921 Act no return to an employer will be permitted on withdrawal of an employee, nor will it be permitted that the employer's contributions be passed on to the withdrawing employee in cash.

March 1943