JIA 77 (1951) 0335-0381

THE INSTITUTE OF ACTUARIES

GROUP LIFE AND PENSION SCHEMES INCLUDING GROUP FAMILY INCOME BENEFIT SCHEMES

BY G. W. PINGSTONE, F.I.A., A.S.A.

Assistant Actuary, Legal and General Assurance Society Ltd.

[Submitted to the Institute, 2 April 1951]

I. INTRODUCTION

DESPITE the fact that a considerable volume of group life and pension business has been transacted in this country for some twenty years and now represents a substantial part of all the life business of quite a number of offices, the subject has received scant attention in the pages of the *Journal*.

The fundamental principles of the business were dealt with in three papers read to the Students' Society over the years 1929–39 (*J.S.S.* III, No. 3, 39; III, 327; V, 122), but the only paper appearing in the *Journal* of the Institute is that presented by A. G. Simons in 1942 (*J.I.A.* LXXI, 375). Several papers relating to various aspects of group business as conducted in America were presented to the Centenary Assembly of the Institute (*Proceedings*, III, 35), but were not discussed in their group aspects.

The fundamental principles as dealt with in the paper by Simons and in the earlier papers to the Students' Society remain substantially unaltered but, in view of the developments in and affecting this class of business, as transacted in this country, since 1942, and its ever-increasing importance to many offices, the time seems overdue for the subject to receive further attention at a sessional meeting of the Institute.

The author's hope is that the details of developments included in this paper and the discussion thereon will provide an up-to-date picture of the business which will be of value to students, and that the purely personal ideas put forward with regard to the bases on which it is transacted will promote discussion which will at least assist in crystallizing thought with regard to the lines on which investigation of the mortality experience of group business should proceed.

In presenting the paper the author would like to express his indebtedness to the authors of the numerous papers on group insurance appearing in *The Record of the American Institute of Actuaries* and the *Transactions of the Actuarial Society of America*, to some of which specific reference is made later in this paper.

II. GROWTH OF THE BUSINESS

Details of the growth of group insurance in America are given in the paper presented to the Centenary Assembly by W. J. Graham, but so far as the author is aware no comparable collective information has been published in respect of the business in this country.

The following statistics covering five of the principal offices transacting this class of business are accordingly presented as an indication of its growth in Great Britain over the last 15 years:

Year ending 31 December	Total group business in force in Great Britain (excluding reassurances)			
	Number of lives assured	Amount of group life assurance	Annual premium income	
			Life assurance	Pensions
		£	£	£
1934	120,300	17,060,000	197,000	1,083,000
1939	366,000	57,310,000	661,000	4,395,000
1944	500,100	93,680,000	1,234,000	7,846,000
1949	709,200	216,860,000	2,702,000	18,818,000

In giving these figures it should perhaps be mentioned that while they undoubtedly represent a substantial proportion of all group business in force in this country there are various reasons for thinking that the figures underestimate the rate of growth of the business as a whole in recent years as compared with that rate in earlier years.

It is interesting to compare these figures with the results of the investigation made by the Ministry of Labour in 1936 into the relative popularity of life office and private schemes. The results were published in the *Ministry of Labour Gazette*, May 1938, and are reproduced in summarized form in *Superannuation Schemes* by G. A. Hosking and R. C. B. Lane (reviewed *J.I.A.* LXXV, 144) at p. 181. They showed that at that time 255,240 employees were covered under life office schemes as compared with 1,361,853 employees covered under private schemes.

Unfortunately, there is no comparable up-to-date information available but having regard to the great increase in popularity of endowment assurance schemes (which are not included in the author's figures) in recent years, it seems a fair conclusion from the above figures that the balance between the number of employees covered under the two types of scheme is very much more nearly equal to-day.

From this point it is of interest to speculate about the scope for new pension schemes of all kinds in private industry, and when it is considered that the July 1950 man-power statistics show 8,402,000 employees in manufacturing industries alone it seems reasonable to conclude that the scope for new schemes is still very large.

III. DEVELOPMENTS AFFECTING THE BUSINESS SINCE 1942

The developments affecting mortality, interest and expenses are dealt with elsewhere, and the purpose of this section is to consider those external factors which have had an appreciable effect on the general conduct of the business in this country during the last nine years. They are as follows:

(1) the consistently high level of taxation on incomes,

(2) the depreciation in value of the £ and the consequent general inflation of wages and salaries,

(3) sections 19–23 of Finance Act, 1947,

(4) the National Insurance Act, 1946, and the National Insurance (Industrial Injuries) Act, 1946,

(5) the higher rate of turnover of labour under conditions of full employment and compulsory national service,

(6) the nationalization of several major industries,

(7) the increasingly high level of Estate Duty,

(8) the increased tendency of employees to defer retirement beyond the normal age under conditions of full employment, and

(9) the special taxation of profits.

(1) *The consistently high level of taxation on incomes*

The principal effect of this factor so far as group life and pension schemes themselves are concerned has been to emphasize the advantages for higher-paid employees of the expense relief afforded in respect of employees' contributions in connexion with pension schemes approved under s. 32 of Finance Act, 1921, as compared with the relief as life assurance premiums afforded in respect of employees' contributions to schemes recognized as *bona fide* pension schemes for the purposes of s. 32(3)(*e*) of the Income Tax Act, 1918.

As a result of this effect it is now quite common to have a 1918-Act group scheme for the lower-paid employees (for whom the deduction of income tax from refunds of contributions required under the 1921 Act can be a serious disadvantage) and a 1921-Act scheme for the higher-paid employees. In a considerable number of cases schemes arranged in earlier years under the 1918 Act have been discontinued for the higher-paid employees, and in some cases for all employees, and a new 1921-Act scheme substituted. This has given rise to the problem of equitable terms for the substituted scheme, since rates of premium were generally more favourable in earlier years and, moreover, were usually guaranteed throughout membership.

The other major effect of the consistently high level of taxation on incomes has been to render it extremely difficult for individuals to save out of income in order to provide capital for retirement, especially in the case of the higher-paid staff, and hence to emphasize the advantages of a scheme which can be non-contributory and which enables a capital sum as opposed to a pension to be taken on retirement. Prior to 1947 the whole sum assured under a pension scheme arranged by endowment assurances could be taken in this way, and this fact tended to restrict the scope of group life and pension schemes under which usually no cash option was allowed. This effect was accentuated by the fact that contributory pensions under 1921-Act schemes cannot exceed £2000 p.a. The position has now been modified by the passing of ss. 19–23 of Finance Act, 1947, and is dealt with further under (3) below.

(2) *The depreciation in value of the £ and the consequent general inflation of wages and salaries*

The effects of inflation have been threefold:

(*a*) The pensions secured in respect of service in earlier years have been rendered inadequate in relation to the new level of prices and salaries.

(*b*) The schedules of benefits have had to be extended to recognize the higher level of salaries now prevailing.

(*c*) Offices have had to provide at unremunerative rates a good deal of pension benefits for which (in the absence of inflation) they would not have become liable.

In respect of (*a*), arrangements have been made to provide further past service credit and/or additional pensions in order to bring the benefits in respect of service to date into line with current salaries, the cost of such further pensions being normally spread over a period of years in the way described by Simons.

The extension of schedules to meet (*b*) has sometimes been very considerable, and whereas it was formerly quite common to find a group scheme which did not recognize salaries of over £1000, in quite a number of cases they now recognize salaries of over £3000 and even of over £5000. The position in this respect is necessarily affected by whether higher-paid employees are catered for wholly or in part under an endowment assurance scheme, but extensions on some scale have been general.

Effect (*c*) was brought about by the fact that it was formerly the normal practice to guarantee rates of premium throughout membership in respect of benefits up to the limit of the existing schedule for employees entering within the first five years of the contract, and similarly on any subsequent change of pension rates. It has led to the new practice under which, for about the last four years, offices have usually guaranteed rates of pension premium in respect of benefits arising in the first three years of a contract only, and have reserved the right to apply revised terms not only in respect of all new entrants but also for increments for existing members occurring after the expiry of the period of guarantee.

(3) *Sections* 19–23 *of Finance Act*, 1947

The main effect of these sections is to render any payment made or deemed to be made by a body corporate to a 'retirement benefits scheme', as therein defined, for the benefit of an employee or director, assessable under Schedule E as income of that employee or director unless (i) the scheme is a 'statutory superannuation scheme' as defined in s. 23 or is a superannuation fund approved under Finance Act, 1921, s. 32, or (ii) the scheme constitutes an 'excepted provident fund or staff assurance scheme or other similar scheme' in accordance with the definition contained in s. 23, or (iii) the payment is made to a scheme secured under life or endowment assurance or annuity contracts which was in force prior to 6 April 1947 and which is not confined or substantially confined to directors and/or other persons who, not being directors, receive remuneration of more than £2000 p.a., or (iv) the main benefit afforded by the scheme is the provision of a pension or annuity for life and either (*a*) the scheme was in force prior to 6 April 1944 or (*b*) the scheme is approved under s. 21, or (v) the employee or director is exercising his employment outside the United Kingdom and is not liable for tax under Schedule E in respect of his remuneration therefrom.

While reference has been made above to a body corporate, the sections apply equally to payments made by unincorporated societies or other bodies except that they do not apply to individuals nor to individuals in partnership.

The definition of a 'retirement benefits scheme' covers the pension benefits provided under both 1918- and 1921-Act group schemes, but it does not cover the life assurance or disability benefits if these can arise only during active service. The definition also covers pension benefits provided under the Hancock procedure (*Hancock* v. *General Reversionary and Investment Co. Ltd.* 7 T.C. 358). 1921-Act pension schemes are, however, completely excluded from the effects of the sections in accordance with (i) above, except to the extent that they have to be aggregated with other schemes in considering total benefits.

The sections therefore affect group schemes only in respect of 1918-Act pension benefits, pension benefits provided under the Hancock procedure and any life assurance benefits provided after retirement from active service in connexion with either 1918- or 1921-Act pension schemes.

An 'excepted provident fund or staff assurance scheme or other similar scheme' is defined as so much of any retirement benefits scheme as relates to persons remunerated at a rate of £2000 p.a. or less provided that the employer's contributions do not exceed 10% of salary or £100 p.a., whichever is the less, and that there is no other retirement benefits scheme in force for the same class of employees. If such another scheme does exist, the requirements in respect of employer's contributions must be satisfied by the two schemes taken together. Under the normal type of group pension scheme the percentage of salary represented by the employer's contributions for any one individual will exceed 10% of salary at older ages and 1918-Act group pension schemes are, therefore, not usually excluded from the effects of ss. 19–23 by (ii) above.

1918-Act group pension schemes which were in force prior to 6 April 1947 are normally excluded from the effects of the sections in accordance with (iii) above until there is some improvement in the benefits provided under the scheme or it is extended to further classes of employee or to directors. Strictly, it is only necessary that the provisions of the scheme as affecting the improvement in benefits or the new class of member should satisfy the sections, but in practice it is usually found more practicable to make the whole scheme approvable under s. 21 if it would not satisfy the requirements of that section as it stands.

In accordance with (iv) (*b*) new 1918-Act group schemes must, except as already indicated, satisfy the requirements of s. 21 of Finance Act, 1947, as well as being acknowledged as *bona fide* pension schemes for the purposes of s. 32(3)(*e*) of Income Tax Act, 1918, if the employee is not to have the employer's premium treated as additional income with the mere allowance of the life assurance relief thereon permitted by s. 19 of the 1947 Act.

The requirements of s. 21 of the 1947 Act—as interpreted by the Inland Revenue at the present time—are briefly as follows:

(*a*) Benefit shall accrue only on retirement at a specified age, on earlier retirement through incapacity or on death. However, no objection is normally taken to the provision of immediate pensions on retirement within the ten years preceding the normal retiring age where retirement is not due to incapacity.

(*b*) The form of retirement benefits shall be the same for all employees of a given class covered by the scheme—the parts of the scheme relating to different classes of employee are treated as separate retirement benefit schemes.

(*c*) (i) At least 75% of the retirement benefits accruing to a member under all retirement benefit schemes of an employer shall be taken in the form of a non-commutable non-assignable life annuity except in cases of extreme ill-health.

(*c*) (ii) In any circumstances in which prior to qualifying for retirement benefits an employee may receive the benefit of all or any part of the employer's premiums, e.g. discontinuance of the scheme, at least 75% of all the benefits must take the form of a deferred non-commutable non-assignable life annuity. An employee would, however, be allowed a return of all his own contributions where these were equivalent to more than 25% of the total benefits, subject to his forfeiting all right to the employer's premiums. Where the annuities are of trifling amount the Inland Revenue are willing to exercise their discretionary powers and allow commutation of the whole.

(*d*) The aggregate value of benefits afforded by the scheme must be reasonably comparable with the aggregate value of the benefits usually afforded under statutory superannuation schemes in like circumstances. This does not preclude the provision of flat-rate pensions or pensions bearing a fixed relation to salary or to pensions taking into account the special qualifications of persons engaged at a comparatively high age, but any case in which all three of the following will apply should be referred to the Inland Revenue Authorities for prior approval:

(i) the total pension will exceed $\frac{1}{60}$th of final salary for each year of service with the employer in question; and

(ii) the total pension will exceed £500 p.a.; and

(iii) the employee's total period of service with the employer in question to normal retiring age will be less than 20 years.

The term 'total pension' includes the benefits under all retirement benefit schemes of the employer in question.

The Inland Revenue also normally require under this section that the scheme shall apply only to full-time employees, and schemes including part-time employees should therefore be submitted to them for prior approval.

(*e*) The pensions or annuities must not be assignable, either in whole or in part.

(*f*) 'Controlling directors' must not be included in the scheme—a controlling director is defined in s. 23 as the director of a company which is director controlled and who himself holds or who is able to control, either directly or indirectly, more than 5% of the ordinary share capital of the company.

The Commissioners have discretionary powers where the main benefit provided by a scheme is not a pension or annuity for life or where any of requirements (*a*)–(*f*) above are not satisfied.

The requirements mentioned in (*c*) above have reduced the attractiveness of superannuation schemes provided entirely by means of endowment assurances for more highly paid staff. As it is still not usual to allow cash options in lieu of pension under 1918-Act group pension schemes, and such options are not permissible under 1921-Act schemes, this has led to the now common arrangement of a group scheme or schemes for all personnel, with an endowment assurance scheme for the more highly paid staff, superimposed, and providing such a scale of benefits as will enable the members to have a cash option in respect of 25% of their pension benefits under all schemes of the employer.

The main effect of ss. 19–23 so far as 1918-Act group schemes themselves are concerned has been to impose the additional burden of securing approval under s. 21 and of ensuring that all the requirements of that section are satisfied by the provisions of the scheme. As mentioned above, this arises not only in connexion with new schemes, but also in connexion with schemes in force prior to 6 April 1947, whenever these are improved or extended to new classes of member. The over-all effect has been to increase very considerably the amount of work involved in securing and retaining the Inland Revenue 'approval' of a 1918-Act scheme. In order to give a clear picture of the over-all position, however, it must be added that the Inland Revenue have introduced many of the features arising out of the 1947 Act into the approval of 1921-Act schemes and thereby complicated that procedure to about the same extent.

As has been mentioned already, ss. 19–23 apply to life assurance benefits provided after retirement from active service, and the Inland Revenue take the view at present that the actuarial value of such benefits at retirement must be regarded as part of the cash option permitted under s. 21(*c*) despite the fact that the benefits are not normally fully-paid and that there is usually no guarantee that the annual premiums necessary to continue the assurance will be paid. This is but one example of the complications and unexpected results to which the sections have given rise.

Another cause of complications is the requirement mentioned in (*f*) above with regard to the exclusion of controlling directors. This has led to most extensive enquiries being made by the Inland Revenue before a director who himself holds less than 5% of the ordinary share capital is permitted to join either a 1918- or 1921-Act group scheme in respect of pension benefits.

It has also led to the introduction of the doctrine of 'near relatives' in respect of both types of scheme. Under this doctrine the Inland Revenue may require the complete exclusion from pension benefits of, or disallow as an expense for tax purposes the employer's payments in respect of pension benefits for, an employee who is a close relative of a controlling shareholder. On becoming a controlling shareholder, whether a director or not, any such employee must be excluded completely from the scheme in respect of pension benefits accruing thereafter if the approval of the scheme is not to be prejudiced.

It will be noticed that in the preceding two paragraphs reference has been made throughout to pension benefits. The reason is that, by virtue of the temporary nature of group life assurance benefits, the Inland Revenue normally raise objection to the provision of such benefits only in respect of controlling directors themselves.

Though, as indicated above, ss. 19–23 cover the provision of pension benefits under the Hancock procedure, they do not affect that procedure but merely necessitate that the arrangement between the employer and employee shall be approved as a retirement benefits scheme under s. 21 if the employee is to escape liability for tax under Schedule E in accordance with s. 19.

(4) *The National Insurance Act*, 1946, *and the National Insurance (Industrial Injuries) Act*, 1946

Prior to the passing of these Acts it was unusual in arranging new group life and pension schemes with a graduated schedule of benefits and contributions to take account of the pension benefits and contributions under the separate National Health Insurance, Unemployment Insurance and Contributory Pension Schemes then in operation. With the much higher rates of contribution required under the new Acts, which came into full force on 5 July 1948, it has become necessary to have more regard to the National Scheme, and it is now usual to make some allowance for the benefits and contributions under this Scheme in at least the lower salary classes.

Methods of allowing for the National Scheme vary considerably, but one which appeals to the author is to decide what over-all percentage of salary or wages the employees may reasonably be expected to pay to the National Scheme and the group scheme combined and then to fix the contribution in each salary bracket as an amount approximately equal to that percentage of the mean salary of the bracket less the contribution to the National Scheme. The scale of benefits is then derived from the schedule of contributions, having regard to the particular basis of contributions adopted, the most usual still being 1*s*. 3*d*. per week per £1 pension per year of service. An example will make the method clear.

If in a particular scheme it is decided that the employees can afford an over-all contribution of $7\frac{1}{2}\%$ of salary or wages and the basis of contributions is to be 1*s*. 3*d*. per week per £1 pension, the scale of benefits and contributions would be derived as indicated below:

Salary class (1)	Salary not exceeding (2)	Mean salary (3)	$\frac{(3)\times\cdot075-13}{3\cdot25}$ (4)	Pension scale		Life assurance while in class (7)
				Benefits (5)	Contributions (6)	
	£	£	£	£ *s*. *d*.	*s*. *d*.	£
1	156	130 sa	−1·00	Nil	Nil	150
2	208	182	0·20	8 0	6	200
3	250	229	1·28	1 8 0	1 9	250
4	300	275	2·35	2 8 0	3 0	300
5	350	325	3·50	3 8 0	4 3	350
6	400	375	4·65	4 12 0	5 9	400
7	450	425	5·81	5 16 0	7 3	450
8	500	475	6·96	7 0 0	8 9	500
9	550	525	8·12	8 4 0	10 3	550
10	650	600	9·84	9 16 0	12 3	650
11	750	700	12·15	12 4 0	15 3	750
	and so on for higher salaries					

It will be noticed that the figures in column (4) have been rounded off in column (5) in order to produce a better graduation in column (6) and to avoid weekly rates of contribution involving fractions of 1*d*.

An indication of the change which has taken place can be obtained by comparing this schedule with that given by Simons. In doing this, of course, the general inflation in the level of salaries should also be borne in mind.

Reference to the National Insurance Act, 1946, would be incomplete without a reference to s. 69(4) thereof which authorizes the issue of regulations for the purpose of modifying or winding up pension schemes in connexion with the passing of the Act.

It was subsequently made clear by the Chief Registrar of Friendly Societies (*J.I.A.* LXXIII, 139) that no general regulations would be issued; it was hoped that, where modification was desired, this would be done in the majority of cases under powers conferred by the constitution of the various schemes. The author is not aware of any group life and/or pension scheme for which it was necessary to obtain regulations under s. 69(4).

From the time when the Bills which became the 1946 Acts were under consideration by Parliament until some while after they came into full force, offices received a considerable number of inquiries with regard to modifications to existing schemes to allow for the benefits and/or contributions under the new National Scheme. Sometimes changes were made by modifying the schedule of benefits and contributions, but the effect was limited and the schemes mostly continued without alteration after the matter had received full consideration.

Whereas in the early years it was quite common to have a normal retiring age of 65 for both males and females under group schemes, the fact that the pension age for females under the National Scheme was reduced to 60 in 1940 has led to this age being almost universally adopted in connexion with new schemes and to requests being received for the amendment of the female retiring age under many existing schemes.

(5) *The higher rate of turnover of labour under conditions of full employment and compulsory national service*

The higher rate of turnover of labour experienced as the result of full employment and compulsory national service has led to considerably more attention being paid to the eligibility provisions of group life and pension schemes than was usual before the recent war.

Whereas in those earlier years it was not uncommon to find a scheme covering all employees with, say, 3 or 6 months' service, irrespective of age, it is now usual to find that there is a minimum entry age as well as possibly a longer qualifying period of service and sometimes a closer definition of particular types of employee.

Perhaps the present situation could best be illustrated by a particular example which can be considered as reasonably typical:

(*a*) Male employees do not become eligible until attainment of age 21 years and completion of one year's continuous service in the case of staff employees or five years' continuous service in the case of works employees.

(*b*) Female employees do not become eligible until attainment of age 25 years and completion of three years' continuous service in the case of staff employees or five years' continuous service in the case of works employees.

(*c*) Employees whose employment is part-time or of a temporary or casual nature are excluded irrespective of their length of service.

It will be appreciated that such provisions do much to ensure that an employee does not join the scheme until there is a reasonable likelihood of his or her remaining in service; hence they minimize the true cost to the employer of providing pensions for those who remain in service.

(6) *Nationalization*

Under the Acts governing the nationalization of the coal, electricity, transport, gas and steel industries, powers are given to the appropriate Minister or Ministers to make Regulations relating to pensions, gratuities and other like benefits. The powers to make Regulations are very wide, and the exact implications in respect of pension schemes of previous employers can be ascertained only from a careful consideration of the Regulations themselves and the interpretation placed thereon. Moreover, it must always be borne in mind that new Regulations can be issued and existing Regulations rescinded or amended.

As an example of a Regulation affecting existing pension schemes reference may be made to Regulation 1 of The Electricity (Pension Rights) Regulations, 1948 (S.I. 1948 No. 2172) as amended by Regulation 2 of The Electricity (Pension) (Amendment) Regulations, 1950 (S.I. 1950 No. 359). Paragraphs (4) and (6) of this Regulation provide as follows:

(4) No person shall on or after the vesting date become subject to any transferred scheme unless he was employed before that date on terms entitling or requiring him to become so subject on attaining a specified age or on fulfilment of some other condition.

(6) Where any person who is subject to a transferred scheme is employed by an Electricity Board other than the Board in whom were vested by virtue of the Act the rights, liabilities and obligations of the relevant body to whom Part II applied, that person shall pay to the first-mentioned Board contributions as provided in the scheme; and the first-mentioned Board shall pay those contributions to the last-mentioned Board together with any sums which under the scheme fall to be paid in respect of that person by way of employer's contribution.

Paragraph (4) of this Regulation means that, except during a limited period following the vesting date, existing private schemes will be closed to new entrants. In many group life and pension schemes it is, however, a condition of the contract between the employer and the assurance company that unless all new eligible employees are enrolled as members the company shall have the right to discontinue the scheme. This Regulation therefore appears to mean that the assurance company might be obliged to continue the scheme despite the fact that one of the cardinal conditions of its original contract will not be fulfilled.

It is clear that in a nationalized industry an employee will not always remain with the Board or Unit which took over the business of his previous employer on the vesting date. After a period of years a situation could therefore arise that employees of the former employer were scattered widely between different Boards or Units, and it would be impossible for an assurance company to deal with each of these individually in respect of a group scheme. Paragraph (6) of Regulation 1 accordingly provides the machinery whereby such an impossible situation would be avoided.

Where only part of an undertaking has been transferred to the nationalized industry the question clearly arises of how the two parts of the membership of a pension scheme of the former employer shall be treated. This is a matter in which reference must also be made to the appropriate Regulations for guidance. In the case of the Electricity Regulations these provide that insured schemes in respect of such undertakings shall not be divided in the way provided for most other types of scheme, but in the case of the coal industry the Regulations require that an insured scheme shall be subdivided and the insurance company issue an identical policy or policies to the Coal Board to cover the benefits of the transferred employees. The new policy or policies would, however, under the provisions of s. 52 of Finance Act, 1946, be exempt from Stamp Duty, to the extent that this had already been paid in respect of the transferred benefits.

All these Regulations detract in no way from the more general provisions of the Acts themselves, and it may well be, therefore, that in respect of some transferred insured schemes the nationalized industry may seek to dispose of them, in whole or in part, by bringing the employees into schemes of their own and accepting a lump sum or paid-up pensions in respect of benefits under the former scheme. The whole position in this respect still appears rather obscure, and it is merely mentioned for its possible effect on existing group life and pension schemes.

Although not involving an industry, it should be mentioned that s. 67 of the National Health Service Act, 1946, gave powers similar to those described above in respect of schemes for employees of bodies taken into that service.

A full consideration of the effects of nationalization on private pension schemes generally and group life and pension schemes in particular is outside the scope of this paper, but the author hopes that sufficient has been said to indicate the additional burden of considering the provisions of the Acts and Regulations and their implications which nationalization has imposed on all connected with the management and administration of such schemes for employees in the industries affected and to give some idea of the possible effects of the Acts and Regulations on the future of certain group life and pension schemes. In all this the author feels that perhaps the most important consideration to bear in mind is that they constitute a factor which was never envisaged in the original contracts and that, in general, it might be said that vital conditions of those contracts have been abrogated without the willing consent of either of the main parties thereto.

(7) *The increasingly high level of Estate Duty*

In recent years, this factor has caused increased attention to be directed to arrangements under which benefits payable on death may, by virtue of s. 4 of Finance Act, 1894, be treated as 'separate estates' and hence avoid aggregation for the purposes of assessment to Estate Duty.

In respect of group schemes this matter has arisen in connexion with both life assurance benefits and options which allow the employee to provide a pension for his widow. The latter gives rise to no particular difficulty beyond ensuring as far as is practicable that the requirements to secure treatment as a separate estate of a pension to the widow commencing on the husband's death will be met.

In order that life assurance benefits may be non-aggregable for the purposes of assessment to Estate Duty it is necessary for the beneficial interest to be vested in a person other than the life assured from the outset. This can be secured by making the benefits payable to an employer or to trustees who have power to dispose of them for the benefit of the dependants of the deceased. Such an arrangement, however, clearly precludes the life assured from being able to see that the benefits are distributed as he would wish, and in the author's view this must be considered a serious objection to adopting it.

In respect of both life assurance benefits and options to provide pensions for widows, it must be borne in mind that 'non-aggregation' will be of little or no value to many lower-paid employees, and in the author's opinion provisions to secure it would, for a considerable proportion of schemes, be wholly inappropriate. It must also be appreciated that Estate Duty practice and/or the governing legislation may change and render the arrangements made unsatisfactory for the purpose in question.

In connexion with non-aggregation it may also be worth pointing out that while the present Estate Duty Office practice is to treat each disposition in which the deceased never had an interest as a separate estate, a literal reading of s. 4 of the Finance Act, 1894, might lead to the conclusion that all such dispositions should be aggregated to form one separate estate as suggested in Green's *Death Duties* (reviewed *J.I.A.* LXXIV, 161) at p. 233.

(8) *The increased tendency of employees to defer retirement*

In the early days of group insurance in this country, when virtually all the schemes were effected under the 1918 Act, pension schemes commonly made no provision for an employee to defer his retirement beyond the normal age. In the (in those days) unusual event of this happening, pensions were paid from the normal pension date.

Shortly before the recent war, however, the Inland Revenue decided that to secure recognition under the 1918 Act new schemes must provide for pension to be deferred if an employee remained at work after his normal pension age, and offices were requested to endeavour to persuade employers to introduce such a provision into existing schemes.

To secure approval under the Finance Act, 1921, it has always been necessary that the Rules of a Fund should provide for the deferment of pension where an employee did not retire at the normal age.

The requirements mentioned above were relaxed during the war, and it seems that the Inland Revenue would not seek to enforce them rigidly under the present conditions of full or over-full employment. They have, however, never been rescinded and, moreover, to secure approval under s. 21(1) of Finance Act, 1947, a new 1918-Act scheme must provide for pensions to be deferred where the employee remains at work. There is a strong practical inducement to defer pensions in such circumstances, as they increase substantially for each year of deferment and thus narrow the gap between final salary and pension.

In practice there seems little doubt that pensions are usually deferred when the employee remains at work after the normal retiring age and as employment conditions and Government policy have, both during the war and since, given definite encouragement to employees to remain at work as long as possible late-retirement pensions have become a major instead of a subsidiary feature of group schemes.

In illustration of this fact an examination of the retirements during the years 1947–49 inclusive occurring amongst employees covered by group schemes assured by the author's own office showed that approximately one-third of the total represented employees who had remained at work beyond the normal age. The proportion was virtually identical in each of the three years and showed no material difference as between males and females.

It may be of interest to mention that, in respect of a normal single-life pension, the order of the increase for each year of deferment is usually some 8%, and that in the event of the employee dying while still in service he is normally treated as having retired on the day preceding his death. Cases in which an option to provide a pension to a widow has been elected are usually dealt with on similar lines, but allowing, of course, for the different contingencies involved.

(9) *Special taxation of profits*

On 1 April 1937 a tax on profits (called at that time the National Defence Contribution) was introduced, and this tax is still in force, although now known as Profits Tax. The Excess Profits Tax which was introduced on 1 April 1939 was, however, discontinued at the end of 1946, being simply a war-time temporary tax.

During the period that both taxes were in force employers were subject to whichever of the two gave the higher liability, and any contributions to superannuation schemes in respect of current service benefits were allowed as a deduction in the same way as for Income Tax. Payments in respect of back-service pensions were also allowed in respect of Profits Tax, but certain special conditions operated in respect of the Excess Profits Tax and, in general, such payments were not allowed as a deductible expense in computing the liability for that tax.

For the majority of employers the Excess Profits Tax applied during the period from 1 April 1939 to 31 December 1946, and the discontinuance of that tax has meant that those employers who were assessed to it have become liable instead for the continuing Profits Tax. As already indicated, in respect of the last-mentioned tax employers' contributions are allowed as a deduction in arriving at the liability in the same way as for Income Tax, although there may be some modification of the position in respect of back-service pensions due to the previous treatment of payments for such benefits in connexion with the Excess Profits Tax.

So far as schemes which commenced since the end of 1946 are concerned the position is simply that whatever contributions are allowed as a deduction in computing liability for Income Tax will also be allowed in computing the liability for Profits Tax. In this connexion it should perhaps be added that a trade or business carried on by an individual or individuals in partnership ceased to be liable for Profits Tax at the end of 1946.

The fact that Excess Profits Tax was mostly a 100% tax and that a substantial part of employers' contributions to approved staff schemes ranked as an expense in the assessment of such tax undoubtedly stimulated the growth of superannuation business during the years in which it was in operation. Its discontinuance and replacement by the lower Profits Tax has naturally reduced this stimulus, but it has also removed a condition which sometimes gave rise to argument; the fact that Excess Profits Tax relief was allowed on current-service benefits' costs but not as a rule on back-service benefits' costs created difficulties when the division was not obvious, as, for example, in a scheme providing a flat pension of, say, £2 per week.

IV. DEVELOPMENTS IN THE BUSINESS SINCE 1942

In this section the author proposes to consider those major developments in the business which have been brought about by the initiative of the assurance companies themselves. In his view they have been

(1) the general introduction of group family-income-benefit schemes, and
(2) the more general issue of group immediate-annuity policies.

(1) Group family-income-benefit schemes

(a) General

The subject of family income policies was dealt with in a paper read to the Students' Society by E. Hampton and W. F. Marples in 1933 (*J.S.S.* IV, 118), and in a paper read to the Institute in 1934 by H. E. Raynes (*J.I.A.* LXV, 122). It has been dealt with more recently in America in a paper presented to the American Institute of Actuaries by A. Pedoe in 1941 (*R.A.I.A.* XXX, 76 and 553).

None of these papers apparently envisaged the writing of such benefits on a group basis, and there is reference to only one British office and, more recently, a few small American offices and one larger one which were willing to grant the benefits under individual policies without a basic whole life, endowment or ordinary term assurance contract.

The distinctive features of the group family-income-benefit scheme are that it provides family income benefits up to a specified age, normally 60 or 65, without a basic contract and on a group basis of underwriting.

The first scheme of this kind was issued by the author's own office in 1937, and there has been a limited but steady demand for such schemes ever since. It is, however, only in the last few years that British offices transacting group business as a whole have been willing to consider granting such contracts.

(*b*) *Benefits and contributions*

The benefits are normally determined by reference to salary classes in the same way as for a group pension and life assurance scheme and usually represent a fixed proportion of the mean salary for each class. The table below illustrates a scheme in which the proportion chosen is one-quarter.

The scheme may or may not be contributory, but, if contributory, the employees' contributions would usually be fixed as not more than half the total cost. As will be seen by reference to the rates of premium quoted in (*d*) below this condition is satisfied by the example given.

Salary class	Salary not exceeding	Annual payment by monthly instalments commencing one month after the death of a member while in the stated salary class and ceasing on the fixed date*	Employees' weekly contribution while in stated salary class
	£	£	*s. d.*
A	250	50	1 0
B	350	75	1 6
C	450	100	2 0
D	550	125	2 6
	and so on for higher salaries		

* The fixed date is the anniversary of the date of entry into the scheme which is nearest to the member's 65th birthday.

Should the member die within three years before the fixed date the benefit would usually be payable for a minimum period of three years.

Where there is a scheme in force to provide ordinary group life assurance, arrangements are normally available for this to be withheld until the fixed date and for interest to be allowed thereon in the meantime. The accumulated amount can then be used to purchase a life annuity or 'split annuity' for the widow or other dependant. The rate of interest allowed in respect of group life assurance benefits withheld does not normally exceed 2% net of income tax.

On leaving service before the fixed date, a member is given an option to effect an individual policy providing identical benefits to those under the scheme and at the rate of premium applicable under the group contract without being required to produce any evidence of health. As with the normal group life continuation option, this option is available only within 31 days of leaving service, and the amount of benefit must not exceed that applicable under the scheme on the day the employee left service.

(*c*) *Underwriting*

Free limits. The distinctive feature of group family-income-benefit schemes from the underwriting point of view is that the sum assured at risk for any individual employee varies with both his salary and the unexpired term to the fixed age.

As, however, benefits are expressed to the members in terms of amount of income benefit per annum, it is clear that the maximum amount of cover which can be allowed without evidence of health must also be expressed in this form. In practice it would seem that for most groups of over fifty lives something rather more than the average amount of income benefit per member can safely be allowed.

Maximum benefits. As mentioned in (*b*) above, benefits under these schemes are normally a fixed proportion of the mean salary of each class. It remains, however, to consider whether from the underwriting point of view an upper limit should be set to this proportion and the amount of benefit.

Schemes of this nature are naturally most attractive to, and appropriate for, married men and widowers with children, and where membership is restricted to such employees it is suggested that the fixed proportion may be up to two-thirds. If, however, the scheme is open to all employees then, in the author's view, the proportion should be considerably lower.

There would appear to be considerable scope for differences of opinion whether an absolute limit should be fixed for the amount of benefit allowed according to the view taken of the function of group contracts in the pattern of life assurance as a whole and whether the office is prepared to envisage reassurance if amounts at risk are excessive for individual lives. In the author's opinion it is desirable to set an over-all limit and to avoid the need for re-assurance.

Special hazards. So far as the author is aware, no office granting these schemes in Great Britain is prepared to include cover against war risks, and the contracts contain clauses excluding such risks on the same lines as those used in connexion with ordinary group life schemes. Unless, however, it is apparent from the initial inquiries that there are other special hazards arising from the nature of the business, etc., it is not usual to limit the cover in any other way.

Guarantee of premium rates. Premium rates are normally guaranteed in respect of benefits coming into force within three years of the commencement of a scheme in the same way as is now usually done in respect of group pension schemes. Thereafter offices reserve the right to change rates of premium in respect of both new entrants and increments for existing members.

Commutation of benefits. In the author's view, commutation of benefits defeats the whole object of such schemes in all normal circumstances. If allowed, commutation should be at a rate of interest substantially above that implicit in the premium rates, since there would otherwise be a dangerous option against the office.

Commencement of assurance. Except in so far as evidence of health is required in respect of benefits in excess of the 'free limit' for the group, commencement of assurance is usually subject only to active employment on the day the employee becomes eligible for membership. Where the scheme is restricted to married men and widowers with children, assurance often commences on the day of marriage, provided that the employee is then in good health.

Percentage of participation. The minimum proportion of eligible employees which is accepted for the commencement of larger schemes is 75%. For smaller groups the percentage required is usually higher. Thereafter membership of the scheme is usually a condition of employment for all new employees as and when they become eligible.

Minimum number of lives. Schemes of this nature are not normally written for less than twenty-five lives.

Commission. This is usually a fixed percentage of the premiums.

(*d*) *Rates of premium*

The genesis of the rates of premium charged for this type of contract was the relationship mentioned under the heading *Nature of Risk* in the paper by Raynes referred to in (*a*) above, namely, that on the English Life Table No. 9 and with a fixed terminal age of 60 or 65 the following relationship was found to hold sufficiently closely for all ages at entry to enable a level annual premium to be charged without producing negative reserves of any consequence:

$$q_x \cdot a_{\overline{n}|} = q_{x+1} \cdot a_{\overline{n-1}|} = q_{x+2} \cdot a_{\overline{n-2}|} = \dots = k.$$

The rates of premium charged today are still uniform for all ages at entry or increase in benefit in most cases, and are generally of the following order where there are no special occupational or other hazards involved:

Fixed age	Annual premium per £100 p.a. income benefit
65	£13. 0*s.*
60	£10. 10*s.*

The same rates are usually charged for both male and female lives if the latter are included in the scheme.

In order to give some indication of the implications of these rates of premium the author has calculated the annual premiums required to provide an income benefit of £100 p.a. to age 65 by the following formula and using the A 1924–29 Ultimate table 2%:

$$\frac{1}{\cdot 9}\left\{100 \times \frac{a_{\overline{65-x}|} - a_{x:\overline{65-x}|}}{\ddot{a}_{x:\overline{65-x}|}} + 3\cdot 0\right\}.$$

Gross premium payable to age 65

Age at entry								
20	25	30	35	40	45	50	55	60
£11·67	11·86	12·20	12·75	13·24	13·64	13·69	13·09	10·69

Bearing in mind that the formula does not allow for the minimum death benefit it seems clear that these results permit the great convenience of the use of a flat rate for all ages at entry and that an annual premium of £13 is not unreasonable. It remains, therefore, to consider the formula itself.

The formula can, of course, be judged only in the light of a full consideration of the underwriting of the schemes as detailed in (*c*) above and having regard to the facts (i) that there is no basic contract, and (ii) that a continuation option is available on leaving service. In the light of all these considerations the author's opinion is that the use of a flat rate of annual premium of £13 for a scheme providing benefits to age 65 is fair and reasonable at the present time.

In connexion with rates of premium, it is of interest to notice that in the discussion of Pedoe's paper one of the larger American companies was stated to have introduced in 1941 an individual non-participating policy providing only family income benefits up to age 65 and with a guaranteed minimum payment in the event of death within a few years of that age at a constant rate of premium for all ages at entry.

In his paper (Table 11) Pedoe gave premium rates for family income benefits up to age 65 which he considered would have been suitable for use in Canada and the United States during the years 1935–39. Adjusting those rates to allow for an income benefit of £100 p.a. they are as follows when premiums are payable over the income period:

Gross premium payable to age 65

Age at entry							
20	25	30	35	40	45	50	55
£11·17	11·70	12·49	13·36	14·22	14·62	14·11	12·18

These rates are stated to be applicable to a participating policy, provided in connexion with a basic contract. It would, however, appear that the only loading justifying participation in profits is a constant of 1·11 in respect of mortality and, having regard to the group basis of underwriting, the minimum death benefit if death occurs within a few years of age 65, the continuation option and the absence of any basic contract, it would seem that Pedoe's figures would justify the use in America and Canada of a flat rate of premium, for a non-participating group family-income-benefit scheme with a fixed age of 65, of the same order as is in general use in this country today.

(*e*) *Taxation position*

Contributions. Since the schemes provide life assurance benefits only during active service they are excluded from the effects of ss. 19–23 of Finance Act, 1947, and it is merely necessary to secure recognition under s. 32 of the Income Tax Act, 1918, for employees to get life assurance relief in respect of their contributions (if any). The employer's contribution is allowed as a necessary expense of the business in the usual way.

Benefits. Since the group policies are drawn to provide a capital sum on death in the same way as ordinary family income policies, benefits are not liable to income tax under existing legislation. With taxation at its present level this constitutes a great advantage as compared with the normal type of private widows' and orphans' fund.

Benefits are liable to Estate Duty, and in view of the substantial capitalized values which can be involved even for comparatively lowly paid employees, it is, in the author's view, desirable that the contract should be so drawn as to secure 'non-aggregation'.

(f) *Valuation reserves*

In view of the use of a flat rate of premium for all ages at entry and the fact that, as indicated in (*d*) above, negative reserves can be shown to be of no practical consequence, the author suggests that, provided the over-all claims experience is satisfactory, a reserve of a proportion of the year's premiums is appropriate for this class of business, so far as future claims are concerned. In addition, there will, of course, be reserves in respect of the outstanding payments under claims which have arisen. In the light of the conclusions reached in (*d*) above with regard to premium rates it would appear that these reserves should be calculated at 2% interest.

(g) *The schemes in operation*

It has been a source of criticism of the ordinary group life and pension scheme that the benefits which it provides on death are inadequate for a family to maintain anything resembling its customary standard of living. The group family-income-benefit scheme in conjunction with the provision of life assurance equal to more than one year's salary under the group life and pension scheme is an effective answer to this criticism, as the following example will show:

> The employer has effected a group life and pension scheme which provides a capital sum at death equal to three years' salary, and a group family-income-benefit scheme providing an income benefit equal to one quarter of a year's salary, with a fixed age of 65 years. Under the former benefits arising on death can be left to accumulate at 2% net of income tax until the fixed date under the family-income-benefit scheme. An employee dies at age 48 (found by the author to be the actual average age amongst a considerable group of such claims) while in receipt of a salary of £600 p.a.
>
> Under the family-income-benefit scheme the widow and children will enjoy a tax-free income of £150 p.a. until the fixed date.
>
> The group life assurance benefit of £1800 is left to accumulate until the fixed date when it will amount to approximately £2500 and can be used to provide the widow with an annuity for the remainder of her life. She is five years younger than her husband, and if she takes a 'split annuity' for a 15-year term this will give her a substantially tax-free income of about £150 p.a. until the age of 75. Thereafter it would be reduced somewhat by the whole pension becoming liable to income tax. Even this effect could, however, be largely mitigated by taking a smaller pension in the guaranteed period in order to provide a larger pension when the whole became taxable.

It will be seen that, in addition to any benefits under the National Scheme, the widow would receive an income of about £150 per annum for life, and should she die before age 60 the full benefits would still be available for the children. The arrangement would, moreover, possess the positive advantage as compared with a normal private widows' and orphans' fund that the widow's income would, under existing legislation, be virtually tax-free up to age 75.

The family-income-benefit scheme from which the example has been taken was so framed that the benefits are treated as a separate estate, and as the capitalized value at 4% interest is less than £2000 Estate Duty was not payable. Also, as in the case chosen there was little other estate beyond the group life assurance benefit and refund of pension contributions no Estate Duty was payable in respect of that either.

The example has been chosen deliberately as involving a moderate outlay. It will be obvious that if the employer, or both employee and employer, are willing and able to afford a higher level of contributions a more adequate benefit can be provided on the same lines.

(2) Group immediate-annuity policies

It is a common experience of those connected with the inauguration of pension schemes that there is a number of former employees who have been granted pensions which are paid out of revenue, and the employer's pension problem is not really solved completely unless arrangements are made to fund this liability. The arrangements should permit also of the funding of any special supplementary pensions for individual employees which the employer may wish to provide in future.

The group immediate-annuity policy provides the answer to the first of these problems irrespective of whether the main scheme is under the 1918 or 1921 Act. It also provides the means whereby the second problem may be dealt with at a later date if the main scheme is under the 1918 Act—if the main scheme is under the 1921 Act it will usually contain powers which permit the augmentation of individual pensions under the terms of the trust.

Essentially, this type of contract is merely a single policy covering the purchase of a number of immediate annuities, but it is clearly an advantage for an employer to have one such policy which can also be used thereafter to cover further purchases as already described. It may, however, have a special underwriting significance in that if an employer purchases immediate annuities for every one of his existing pensioners 'selection' against the office is clearly avoided and, provided a sufficient number of pensioners is involved, there is justification for the allowance of more favourable rates than would apply for individual purchases of the same kind.

Provided that the conditions of the 'Hancock' precedent (mentioned in § III (3) of this paper) are satisfied and that each purchase is approved under Finance Act, 1947, s. 21 (1), the employer is allowed the cost of the annuities as an expense in the year in which they are bought, and there will be no liability on the pensioners under Schedule E in respect of the considerations.

There is nothing particularly new or original in such arrangements; but they do cover a problem which can easily be overlooked and there has been much more general appreciation of their value in recent years.

V. PREMIUMS FOR GROUP LIFE AND PENSION SCHEMES

(1) *General*

In Simons's paper, to which reference has already been made, details are given of the bases on which the group life and group pension rates then in use for new schemes were calculated.

The terms there described remained in general use until 1947, when, arising out of the Dalton era of cheap money, pension rates calculated on similar lines but at $2\frac{1}{2}\%$ interest were introduced. At the same time group life rates were reduced to a level which for a normal group produced a cost equal to some 80% to 85% of that calculated on the former rates.

The revised group life rates are still in general use, but at the end of 1948 most offices reverted to pension rates calculated at 3% interest, with an adjustment to allow for improving mortality amongst pensioners. These rates may be considered as intermediate between those introduced in 1947 and those in use when Simons's paper was written. They are still in general use.

It remains to consider in the light of current and future conditions the bases underlying the present rates.

(2) *Interest*

In deciding what rate of interest is appropriate for the calculation of premium rates for group pension schemes, it is essential to bear in mind the necessarily long-term nature of these contracts.

The duration of membership of individual employees may vary between something over 50 years for an employee who is aged 20 at entry, and some 20 years for an employee who enters at age 50, and on the average may be taken as some 35 years. In the author's view, therefore, there may be times in which it is justifiable to assume a rate higher than would be indicated by the current yield on new investments, though at other times it would be wrong to assume a rate as high as that indicated by that yield.

At the present time, the current gross yield on long-term gilt-edged stocks exceeds 3%, but having regard (i) to the tendency of interest rates to decrease over long periods of time and (ii) to the increasing degree of control exercised by modern governments over economic and financial affairs, it would in the author's view be unjustifiable to assume a rate of interest of more than 3% in the calculation of group pension rates for current use.

On the other hand, it appears that, except by exercising compulsion over the individual, no government will in the long run be able to borrow substantial sums of money at appreciably less than 3% without inflating credit and risking runaway inflation, and to use a rate appreciably lower than 3% would therefore also be unjustifiable at the present time.

It seems, indeed, that with taxation as it is at present, 3% is a rate which offices might reasonably expect to be able to retain over relatively long periods, thus avoiding the serious administrative complications caused by frequent changes of premium rates to accord with current yields rather than long-term prospects.

(3) *Expenses*

This is an item over which under stable economic and financial conditions managements have a considerable degree of control.

Under the present inflationary conditions there must inevitably be some tendency for expenses to rise in advance of the corresponding rise in premium income, but if the conditions do not continue unduly long this can perhaps be ignored.

There are, however, certain expenses over which managements have no control. Thus, for example, some rates of stamp duty were doubled by Finance Act, 1947, s. 52.

In connexion with this matter it is of interest to notice from Table 5 of the paper presented to the Centenary Assembly by W. A. Jenkins (*Proceedings*, II, 260) that, in 1947, a typical loading for group pension rates in America was 8% of the premiums.

(4) *Mortality*

It must be a chastening thought for any actuary intimately connected with group life and pension business that, although a considerable volume of the business has been transacted in this country for some twenty years, no full investigation of the mortality experience has yet been carried out.

A beginning has been made with the commencement as from 1 January 1948 of a continuous investigation into the mortality of pensioners under group and individual-policy schemes, but for reasons mentioned later the author considers that no reliable conclusions can yet be drawn therefrom, and it does not cover mortality during the deferred period.

Pensions. From an investigation of the mortality of group pensioners of his own office over the years 1946–49 inclusive, and an examination of the expected and actual amounts of reserve released by death during the deferred period in the years 1948–49, the author is of the opinion that the rates produced by the use of A 1924–29 ultimate mortality for the deferred period combined with $a(f)$ and $a(m)$ ultimate mortality thereafter and the adjustment in general use for future improvement do provide some over-all margin for improving mortality. In the absence of detailed investigations in respect of mortality during the deferred period and of pensioners' mortality, with appropriate projection into the future, it is, however, impossible in his view to say whether that margin is adequate.

Life assurance. The examination of expected and actual amounts of reserve released by death during the deferred period mentioned above indicated that active-service mortality measured on that basis was lighter than that expected by the A 1924–29 ultimate table. As the results were not subdivided by age it would be dangerous to assume that the same over-all result would be obtained by a detailed examination of mortality in respect of life assurance benefits. Nevertheless, it seems likely that the present rates of group life premiums do contain some margin.

VI. INVESTIGATION OF MORTALITY EXPERIENCE

(1) *General*

As mentioned in the preceding section of this paper, no detailed investigation has been made into the mortality experience under group life and pension schemes in this country except to the extent that a continuous investigation into the mortality of pensioners, as such, was commenced on 1 January 1948. The matter has, however, received much attention in America, particularly in respect of group life assurance, and a great deal can be learnt from a study of the pioneer work carried out there and published in *The Record of the American Institute of Actuaries* and the *Transactions of the Actuarial Society of America.*

The first investigation into the mortality experience under group life contracts was carried out by E. E. Cammack and E. B. Morris and the results published in 1918 (*T.A.S.A.* XIX, 29), the business having started only six years previously. This covered the experience of the Aetna Life and Travelers Insurance Companies only, but in 1921 the results of an investigation into the experience of six of the leading offices was published by E. E. Cammack (*T.A.S.A.* XXII, 222) and similar investigations have been made continuously ever since, the latest results being published in *T.A.S.A.* XLIX.

Group pension business started in America in the middle 1920's, and in 1937 a committee of three of the leading offices was set up to conduct a continuous investigation into the mortality experience. The first results were published in a paper presented to the American Institute of Actuaries in 1940 by H. J. Stark (*R.A.I.A.* XXIX, 37). Further results have been published in *T.A.S.A.* XLIX.

In the light of the American investigations and some minor investigations into the experience of his own office the author puts forward the following suggestions with regard to the investigation of British experience.

(2) *Group life assurance*

One of the handicaps which an actuary finds in dealing with the underwriting of group life assurance in this country is a dearth of suitable up-to-date data upon which to base industrial loadings. This was of less importance in the past when the life assurance rates contained a substantial margin, but as rates are adjusted to accord more closely with actual experience it becomes increasingly important.

In the interest both of charging the most equitable rates and of simplifying the underwriting of the business it is, therefore, in the author's view very desirable that an investigation of the experience permitting of subdivision as below should be made at the earliest possible time.

(i) Into broad industrial groups according to the main business of the employer.

(ii) According to whether the scheme covers staff employees only, works employees only or both staff and works employees.

(iii) According to the geographical location of the main group of employees included in the scheme.

(iv) According to the year in which the scheme commenced.

In order to avoid any misunderstanding the author would, however, explain that he does not envisage that all these subdivisions of the data would necessarily be made or that they would be mutually exclusive.

Owing to the great heterogeneity of the data it would be essential in the author's opinion that any such investigation should be by amounts as well as lives, in order that the effect of the different classes of lives involved might be seen.

Unfortunately, there are three features of group life assurance in this country which appear to make it impossible to derive any reliable results based on amounts and render it possible in respect of lives only if a considerable number of schemes were excluded from the investigation. The features are

(*a*) that it is quite common for life assurance benefits in excess of the free limit appropriate to a group to be allowed subject to satisfactory evidence of health;

(*b*) that in many of the smaller schemes all benefits are, or have at some time been, subject to satisfactory evidence of health;

(*c*) that it is not a universal requirement that an employee shall be actively at work on the day that an increase in life assurance is due to take effect in order for this to become operative, and that the practice in this respect has varied from time to time.

In the light of this position the author concludes that so far as combined group life and pension schemes are concerned an investigation based on lives covered for, and units of, current pension benefits would be a more satisfactory basis for the investigation of mortality during membership prior to normal pension date.

Schemes providing group life assurance benefits only do not constitute a large proportion of the total group life business in force in this country and they could therefore be ignored entirely for the purposes of the investigation. In general, however, such schemes are large and features (*a*) and (*b*) mentioned above would not therefore usually exist. In respect of this section of the business a separate investigation by lives and amounts might be expected to produce reliable results after excluding a few smaller schemes. It would, however, be necessary to consider the data carefully with regard to feature (*c*).

In the foregoing no reference has been made to the investigation of the total and permanent disablement benefit—under which the life assurance is payable by monthly instalments over a period of years (usually five). The reason is that this benefit has lost much of its popularity due to the administrative problem of deciding when the conditions for payment are satisfied. It is moreover quite common to include it for males and not for females. In view of its diminished importance this is a feature which could be omitted from the first investigations although it would appear desirable to include the necessary data in the returns from offices.

An investigation into the mortality and discontinuance rates in respect of group conversions, i.e. employees electing to take an ordinary policy under the continuation option available on leaving service before age 60, would be desirable. This is, however, a matter essentially apart from the group scheme from the point of view of investigation and could therefore be left over until a later stage.

(3) *Pensions in the deferred period*

The nature of the investigation which the author considers necessary has already been indicated in (2) above. It remains, however, to consider two special features, namely:

(i) how employees withdrawing in ill-health should be treated;

(ii) how the data in respect of current service pensions could be used to give rates of total and permanent disablement if required.

(i) It would appear that, originally, it was envisaged that when an employee withdrew in ill-health all the employer's premiums (calculated on the basis of no return in the event of death) would be forfeited completely and in the first American investigation into mortality under group pension business it is particularly noteworthy that the ill-health withdrawals had been dealt with on that basis and were treated as deaths. It is also of special note that only by dealing with the ill-health withdrawals in this way was it possible to show that the experience during the deferred period justified the assumptions made in calculating premium rates and reserves.

British offices, however, have found this condition difficult to administer and have adopted various palliatives such as allowing a fixed proportion of the normal surrender value in all cases of withdrawal in ill-health, trying to assess each case of ill-health withdrawal on its merits, etc. Having regard to the position described in § V (4) of this paper under the heading *Life Assurance* there is no doubt that some such treatment (coupled with granting early-retirement pensioners only the value of their benefits on the basis of their actual mortality—to which further reference is made later) is necessary to justify use of the A 1924–29 ultimate table in respect of the deferred period.

In the author's view, however, it would be more satisfactory if true active-service mortality were used in the calculation of premium rates and reserves so that it would not be necessary to retain part or all of the reserves held for those withdrawing in ill-health (with the exception of certain cases of admitted total and permanent disablement claims for the reasons mentioned in (ii) below) to support the benefits of employees continuing in service until normal pension date, and normal surrender values could be paid in respect of such withdrawals.

The author would therefore propose that, in the investigation of British experience, ill-health withdrawals should be treated as deaths only if they are cases of admitted total and permanent disablement claims in which death occurred within two years from the dates when the employees were last actively at work.

(ii) There would appear to be no difficulty in obtaining rates of total and permanent disablement from the pension experience since it is not usual to pay a refund of the employee's contributions until the last instalment of total and permanent disablement benefit has been paid or on previous death. In any case, however, there would be an employer's surrender value withheld. Also, since the pension experience would be examined separately for males and females, schemes under which the total and permanent disablement benefit applied only to the former would present no special difficulty.

In connexion with this matter it is necessary to consider the provision of virtually all group policies which allows life assurance, and the alternative total and permanent disablement benefit where this is included in the scheme, to be continued under the scheme, for a period of up to two years where an employee ceases work on account of ill-health, subject to the continued payment of premiums. There would seem some possibility that where the alternative disablement benefit was available the employer might be more inclined to take advantage of this provision to permit continued cover. On the other hand, the attitude of employers in this matter varies considerably and it might well be that deaths would in fact occur under schemes without the disablement provision which would have been disablements under a scheme including that provision.

Separate investigation of the two types of scheme would be desirable if circumstances permitted. Without this the use, in the calculation of group pension premium rates, of strictly active-service mortality based on the whole experience coupled, in the case of schemes including the total and permanent disablement benefit, with the complete forfeiture of the employer's premiums in respect of cases of admitted total and permanent disablement claims unless the employee survives the full period over which that benefit is payable, would appear to err, if anything, on the safe side. In this connexion the author envisages that in such cases of admitted disablement claims the employee would be treated as a normal early retirement if he was within ten years of normal pension age when the last instalment of the benefit became payable. If he was not, he would receive a refund of his own contributions at that time and be credited with a fully secured pension commencing ten years before his normal pension age in respect of the employer's premiums to date. Alternatively, it could be provided that the employer would receive the normal surrender value at that time.

It should be mentioned that it is the provision referred to in the last paragraph but one, coupled with the requirement of active employment before life assurance can be effective, which causes the author to say in (2) above that the data should be capable of subdivision according to the year in which the scheme commenced. It is quite clear that in the first two years of a scheme mortality and, more particularly, total and permanent disablement rates are likely to be much lighter than in later years, especially when the industrial risk is high. The same tendency may also continue in later years due to the failure of employers to attach full value to the provision for continuance of life assurance under the group contract itself in cases of ill-health until the scheme has been in force some years.

If the total and permanent disablement rates were investigated then it would clearly be desirable to investigate also the rates of mortality and recovery amongst actual claims.

(4) *Pensioners*

Classification. The basis of the purchase of pension benefits is in essence a simple single-life deferred annuity from a fixed age. If the office is not to be involved in a loss in the event of an employee retiring before or after the fixed age or of his electing to substitute a joint life and last survivor pension it is necessary (subject to a qualification mentioned later in respect of early retirements) that the pensions granted shall be the actuarial equivalent of the amount of the basic benefit on the basis of the actual mortality of the type of life in question. It therefore follows that for the purpose of such options the mortality of pensioners must be investigated separately for each of the following classes:

(i) those retiring before the fixed age—early retirements;
(ii) those retiring at the fixed age—normal retirements;
(iii) those retiring after the fixed age—late retirements;
(iv) those electing some form of joint life and last survivor pension.

In the continuous investigation commenced on 1 January 1948 classes (ii) and (iii) are combined and there is no provision for separate investigation of class (iv). This will, however, clearly not meet the requirements because an investigation by lives of the experience during 1948 and 1949 of normal and late retirements occurring since 1 January 1947 under schemes administered by the author's own office showed that the mortality of late retirements was 18% heavier than that of normal retirements. The data for class (iv) were too few to allow of any definite conclusions.

Lives and Amounts. The investigation into the experience in respect of all group annuitants of the author's own office mentioned in § V (4) of this paper under the heading *Pensions* showed that the mortality by amounts was 7% less than that by lives. The author therefore regards it as essential that the mortality of pensioners should be investigated by both lives and amounts. The continuous investigation is at present by lives only.

Selection. A comparison of the mortality by lives in respect of new pensioners mentioned under the heading *Classification* with that of all pensioners mentioned in the last paragraph showed that the latter was some 20% less than the former, the difference being appreciable in all age-groups. It appears, therefore, that the investigation of the mortality of pensioners should be on a select basis. The continuous investigation is at present on an aggregate basis.

Employees deferring retirement. The investigation of the mortality of late retirements envisaged above would cover only the period after retirement, but in order to arrive at correct late-retirement factors it is clearly necessary to know what proportion of those who defer retirement die in service. It would therefore be necessary to conduct a separate investigation into this element. In view of the considerable standardization of normal retirement ages it might be sufficient if this investigation were on an aggregate basis, but the data should be capable of subdivision if necessary according to the normal retiring age of the scheme.

Subdivision of data. It would be desirable that the data should be capable of subdivision in the first three ways mentioned under (2) above.

VII. SUGGESTED DEVELOPMENTS

It has already been suggested in the preceding section that if premium rates and reserves were calculated on true active-service mortality only it would be possible to allow the normal surrender value in all cases of withdrawal, other than cases of admitted total and permanent disablement claims.

Consideration of that suggestion leads the author to the further suggestion that it would also enable considerably more generous pensions to be provided in cases of early retirement since these could be dealt with on the basis of substantially the full reserve held against the amount of pension secured from normal pension age instead of the value of those benefits on the basis of the actual mortality experienced by early-retirement pensioners. An example used purely for the purposes of demonstration will, he hopes, make the idea clearer:

> A man retires *n* years before his normal pension age of 65 having contributed at the rate of 1*s.* 3*d.* per week in respect of each £1 of pension secured from the normal age. The normal pension is payable monthly for a minimum period of five years from the normal age, but early-retirement pensions carry the usual guarantee that on the employee's death any excess of his own contributions over the amount of pension received to the date of death will be paid to his estate. The employee's contributions are returnable without interest.
>
> The rates of premium charged were based on the $a(m)$ ultimate table at $2\frac{1}{2}\%$ interest in respect of the annuitant period. In Case I the mortality assumptions in respect of the deferred period were such that on early retirement it was necessary to restrict the pension to the equivalent of the value of the benefits secured from normal pension age on the basis of the actual mortality of early-retirement pensioners. In Case II, however, strictly

active-service mortality has been assumed for the deferred period and the early-retirement pension can therefore be substantially the equivalent of the full reserve on that basis.

Investigation has shown that the mortality of early-retirement pensioners is such that whatever the age at which the employee retires he experiences essentially the same mortality as an employee who retires at the normal age.

The annual rates of active-service mortality used in Case II were derived from the Service Table in Appendix I of the paper by W. F. Marples in *J.I.A.* LXXIII.

The early-retirement pensions which can be allowed will be determined approximately by the following formulae:

Case I.
$$\frac{D_{65+n}\cdot \ddot{a}^{(12)}_{\overline{65+n:\overline{5}|}}+3\cdot 25\,(M_{65}-M_{65+n})}{D_{65}\cdot \ddot{a}^{(12)}_{\overline{65:\overline{m}|}}},$$

where all functions are calculated on the $a(m)$ ultimate table at $2\frac{1}{2}\%$ and m is the guarantee period necessary to ensure that the employee and his estate receive in pension at least the amount of his contributions.

Case II.
$$\frac{D^{a}_{65}\cdot \ddot{a}^{(12)}_{\overline{65:\overline{5}|}}+3\cdot 25\,(M^{a}_{65-n}-M^{a}_{65})}{D^{a}_{65-n}\cdot \ddot{a}^{(12)}_{\overline{65:\overline{m}|}}},$$

where 'a' signifies true active-service mortality on the basis mentioned above, the annuity values are on the $a(m)$ ultimate table and all functions are calculated at $2\frac{1}{2}\%$.

The results by the two formulae are as follows:

Number of years between retirement and normal pension age	Percentage of pension secured from normal pension age available on early retirement	
	Case I	Case II
1	93·8	98·0
3	79·0	90·9
5	66·0	84·7
7	54·8	79·2
10	41·2	71·8

The figures for Case I are very similar to, although not identical with, the proportions in general use at the present time, so that the results for Case II do demonstrate the suggestion.

The author is conscious that the proposal to allow early-retirement pensions on some such scale as for Case II above in respect of schemes based on strictly active-service mortality in the deferred period is not without its dangers in the shape of altered mortality due to the introduction of more liberal early-retirement pensions and perhaps a greater readiness under different employment conditions to allow or compel employees to retire early.

A margin on actual experience would clearly be necessary to provide against such eventualities, and it would also be necessary to ensure that the provisions of the scheme were such that in no circumstances, e.g. discontinuance of the scheme, could the office be faced with providing early-retirement pensions for all employees, or all employees over a specified age on the same basis. The fact remains, however, that the results produced would still be very much more generous, and nearer to those of the ordinary private fund, than is possible at present.

The cost of the more generous treatment of early-retirement pensioners and of allowing the normal surrender value in all cases of withdrawal other than admitted total and permanent disablement claims would, of course, have to be met in the premium rates, but this would not appear to be prohibitive and having regard to the considerable advantage of providing a more adequate solution of the employer's pension problem and avoiding difficulties in administration the author puts them forward as possible developments which in his view should receive careful examination following the full investigation of the mortality experience in respect of British group life and pension business.

VIII. CONCLUSION

Group life and pension business in this country began, and for the first ten years of its history continued, as a simple solution of the employer's pension problem having no special regard to securing the maximum advantage from then current tax legislation.

In the second ten years of its history the business itself has continued to progress and evolve to provide a more complete solution of the pension problem in general, and the problem of adequate provision for dependants on death during active service in particular. The transaction of the business has been rendered much more complex by many outside social and economic factors, but especially by sections 19–23 of Finance Act, 1947—which have had the effect of creating two almost equally complex systems for the approval of pension schemes for income tax purposes, but which afford entirely different relief in respect of employees' contributions and discriminate between private and life office schemes.

The business will undoubtedly continue to evolve, in conjunction with other types of life office scheme, to produce an increasingly adequate solution of the pension problem under changing conditions. The prerequisite to progress is, however, research and in this connexion it is to be hoped that it will be possible to commence a comprehensive investigation of group mortality at an early date.

The whole question of the income tax law relating to pension schemes is now under consideration by the Millard Tucker (No. 2) Committee. It is to be hoped that their deliberations will, in the national interest as well as that of those concerned with life office pension schemes, result in a single system of treatment for all schemes as well as affording similar treatment to individuals carrying on a profession or business on their own account, so that they too may be able to provide themselves with adequate pensions on retirement, in an age when the saving of capital for that purpose out of taxed income has become impossible.

Finally, the author must acknowledge the help and assistance which he has received from his colleagues, M. I. Douse, M. F. H. Coward and D. W. Piper, in connexion with most of the figures contained in the paper and in discussing with them some of the ideas put forward. He also expresses his sincere thanks and appreciation to the offices which kindly provided the data upon which the table contained in § II of the paper is based.

ABSTRACT OF THE DISCUSSION

Mr G. W. Pingstone, in introducing the paper, said that §§ II, III, IV and V were largely factual and represented an attempt to bring up to date the picture of the business as given in Mr Simons's paper and the earlier papers to the Student's Society. He regarded the subject-matter of §§ V, VI and VII as the most important for the future of the business. In his view, the full investigation of group mortality with the minimum of delay was essential to the healthy development of the business.

His proposal to use true active-service mortality in the calculation of group pension rates might appear rather revolutionary. However, the practical difficulties of dealing with employees withdrawing in ill-health under the existing system were very real, both from the administrative point of view and from that of mortality investigation and the more scientific calculation of premium rates. The remarks made in § VI (3) (i) applied equally to the second American investigation, which related to the year 1946. In the first American investigation the number of ill-health withdrawals had been equal to one-third of the number of deaths in active service, and in the second it had been equal to no less than one-half that number. In both investigations the proportions had been much higher for females than for males.

Some results from investigations into the mortality experience of group annuitants of his own office during the year 1950 would, he thought, be of interest.

The proportion—mentioned in § III (8)—of retiring employees who had remained at work beyond pension age was again approximately one-third for both males and females.

In 1950, the difference in mortality mentioned under the heading *Lives and Amounts* in § VI (4) had increased to 10%, and a separate investigation in respect of group annuities set up since the end of 1946 showed exactly the same disparity.

The disparity mentioned in § VI (4) under the heading *Selection* had been somewhat reduced by the inclusion of the results for 1950 with those of the two earlier years, but remained substantial. The results seemed to suggest that selection might be limited to about the first three years after retirement, but the investigations did not permit of any definite conclusion.

The results of the investigations of mortality by amounts closely reflected the financial experience in terms of reserves. That result might perhaps have been expected, but it served to emphasize the importance of investigating the mortality of group annuitants by both lives and amounts and not by lives only.

Mr R. W. A. Fowler, in opening discussion, said that the author had made no mention of one particular development of group life assurance, namely, group policies on a basis which, for want of a better title, might be called 'profit sharing'. The practical difficulty which was encountered with group life policies on a year-to-year basis was that it was so easy for a purchaser to strike a balance between the premiums paid to the insurance company and the amount paid out in claims. Needless to say, the balance was nearly always in favour of the insurance company, and grievances arose. To counter the difficulty, two bases had been adopted in practice.

The first basis was on orthodox lines: the profit of all group business was assessed and part was shared between group policies on some fixed formula.

On the second basis, of which he had had no practical experience, the insurance company charged a certain increase in the premium and guaranteed to return to the insurer the excess, if any, of a fixed percentage of the premium paid in each year over the actual claims paid in that year. The precise percentage for a given increase in premium depended on the size of the group, the possible variations in sum assured and, in fact, on any factor affecting the shape of the probability curve of deaths.

To put the matter quite simply, if p_r were the chance of r deaths occurring in a year in a group of n lives with unit sums assured, nq the expected number of deaths and k the expense loading per unit of premium, the normal premium for the year, say P, would be $(1+k)\,nq$, where $nq=\sum_{r=0}^{n} rp_r$. Under a special form of contract an additional g

per unit might be charged for the right to receive the excess, if any, of a proportion of the premium, say $h(1+g)$ P, over the actual claims r. The values of g and h would be linked by a relationship which could be found from the equation

$$(1+g)\,\mathrm{P}=(1+k)\left\{h(1+g)\,\mathrm{P}\sum_{r=0}^{m}p_r+\sum_{r=m+1}^{n}rp_r\right\},$$

m being the largest integer in $h(1+g)$ P.

He would not enlarge further at this stage, except to say that it obviously followed that the application of the normal curve of error to the last equation, making proper allowance for all other factors affecting variation, would produce the required values of g and h. With a large group with a fairly constant sum assured, it had been found that g would be between 5 % and 10 % if h was required to be 80 %. In other words, with a large group, if the claims were less than 80 % of the premium, then the office returned up to 80 % of the premium, and for doing that charged between 5 % and 10 % on the ordinary group premium to cover the additional benefit.

It was interesting to analyse the reasons why pension business administered by life insurance offices had developed in the way it had. If an office were approached and asked to provide a temporary life assurance followed, at a fixed age, by a pension benefit, the obvious answer would be an endowment assurance with a pension option. There were many schemes based on that simple principle, but such a policy was taxed as life assurance. If it was broken down into a temporary assurance and a deferred annuity without return, the latter part of the benefit came within the annuity fund, for which more competitive rates could be quoted. With the growth of the business many offices had placed so much deferred annuity business on their books that the advantage had been lost to a certain extent. But group pension scheme rates assumed interest at 3 % p.a., a rate which could give little margin in those offices whose annuity funds had to bear a considerable amount of tax.

The extension of the group principle to a large number of policies conforming to a pattern was obvious and needed no comment.

He felt quite sure that endowment assurance premiums were not currently based on such a high rate of interest as 3 %, and it consequently followed that the group life and pension approach would give better value for money than a straightforward endowment assurance scheme. The extension of group schedules to include higher salary grades mentioned in § III (2) (*b*) required other factors to be taken into consideration. Where senior employees with reasonably large policies were concerned, an insurance company would, he believed, prefer to issue straightforward endowment assurances. Also, such employees were in the class where life assurance cover of a 'non-aggregable' nature was exceedingly attractive, and there was the important 25 % cash provision, referred to by the author in § III (3), to be considered.

Thus, even where a group scheme was on a 1921-Act basis, it would still be preferable to restrict extension of group schedules to a comparatively low maximum salary, such as £1500, and to deal with pensions on salaries above that figure by endowment assurances, as the author suggested.

The paper dealt at some length with the effects of the Finance Act, 1947. It was extremely difficult to produce an interpretation of the provisions of §§ 19 to 23 of that Act in a simple form. The author had condensed the complicated provisions in an exceptionally clear way. He would enlarge on the author's remarks on the question of director control.

It was not always understood that approval under the Act did not necessarily imply recognition of premiums paid by an employer as an allowable expense; the two questions were quite distinct and separate regulations were applicable. For instance, in determining whether a company was 'director controlled', the Inland Revenue authorities were concerned merely with the holdings of the directors in a personal capacity or as trustees—near relatives did not affect the question of approval under the 1947 Act.

Recognition of payments as an allowable expense, however, was only given after the holdings of near relatives were taken into account. Consequently, it could happen—

with a company which was family-controlled, but not director-controlled—that 1947-Act approval was obtainable but that payments made by the company were not allowed as an expense.

A complete definition of near relatives was difficult to obtain. In considering relationship, the Inland Revenue authorities seemed to pay more attention to a 'vertical' connexion in a family tree than to a 'horizontal' relationship. Second cousins, for example, would probably be treated as being unrelated persons for the purpose of the allowance of premiums as an expense.

The more controversial parts of the paper were §§ VI and VII. Theoretically, of course, the author was right in suggesting the various subdivisions into which to group the mortality experience. He could not help feeling, however, that, even if the requisite standardization of returns from offices could be obtained—and that would be difficult—the results would be unlikely to be used in detail in practice.

The author's suggestions with regard to the use of active-service mortality were interesting, but he doubted the practicability of adopting them.

Active-service mortality was effected by the experience with regard to withdrawals. Rates of withdrawal were more variable than rates of mortality, being affected by economic conditions and by more personal aspects of the employer-employee relationship. In those circumstances, would life offices take the chance that conditions producing the rates of active-service mortality over one period would be reproduced in the following periods? The author himself, in § VII, recognized the danger, and it was difficult to see how the necessary safeguards could be applied. The safety margin suggested would go some way to meet the possibilities of variation, but, for such margins to be adequate, it would be necessary to charge heavy premiums for ill-health retirement benefits.

He joined with the author in hoping that the Government Committee on the Tax Treatment of Retirement Benefits (the Millard Tucker (No. 2) Committee) would produce a reasonably simple scheme which would not only result in more equitable treatment between the various types of pension arrangement but would relieve insurance companies of some of the existing complications.

Mr E. F. Martin thought that they were all indebted to the author of the paper, and not least for his comprehensive analysis of the development of group schemes. The wealth of material should be valuable to the student, particularly the information about current practice of the Inland Revenue, and he had no doubt that those who were engaged in the day-to-day operation of such schemes would also find much reference matter that would be helpful.

In § V (2), where the author dealt with the interest basis of pension premium rates, he might have dwelt at some greater length upon the subject of the effect of taxation upon the interest earnings of annuity funds according to the relationship between the interest income of the annuity fund and the annuities payable. That relationship was of importance in current conditions but the author might have preferred to remain silent in view of the deliberations of the Millard Tucker (No. 2) Committee.

The author had done a service in drawing attention to the lack of suitable mortality experience for the conduct of group business. There was an attempt to remedy the defect in the recently commenced investigation into the mortality of pensioners. Many of those who were transacting the business, however, and employing the same mortality basis during the period of active service for both pensions and life assurance, would, from their knowledge of the current level of life assurance claims, have felt that the mortality basis underestimated the rate of survivance to pension age. He thought that the underestimate of the value of the pure endowment in the 'without return' premiums (and even in the 'with return without interest' premiums) might well nullify any improved net interest yield which the more fortunate offices might secure. For the time being, offices were doubtless content to set off any undervaluing of the pure endowment against a recent improvement in interest yields, but that approach savoured of acting in the dark and was not helpful in considering reserves. There was a way out of that particular problem, though not a very acceptable one and not one that could be introduced into existing schemes; it was to ignore mortality altogether and to charge rates based solely upon interest during the period to pension age. The employer's cost would increase on two counts, a larger share of the pension to purchase and a higher rate of premium therefor, compensated, however, by larger surrender values on withdrawals. Such a system would at least ease the difficultites experienced by offices in dealing with ill-health withdrawals and early retirements.

Such a solution did not, however, reach the heart of the problem, for it brought no nearer the achievement of adequate reserves on the old business. He would support the author's advocacy of an investigation into active-service mortality based upon pension experience, for the reasons he suggested. He did not think, however, that it was essential to introduce complexities by way of division of the data into various groupings. He suggested that the investigation might be confined to one combined group consisting of staff employees and work people of non-hazardous industries, whose 'active service' mortality experiences did not seem to be greatly dissimilar; and that the investigation should be based on units of current pension benefit alone, not on individuals also. The mortality rates so derived would be suitable for premium rates and reserves for both life assurance and pensions. For groups engaged in the more hazardous occupations, extra mortality could be dealt with by suitable extra premiums for life assurance.

The opener had referred to with-profit group assurances. There were known to be diverse opinions about that type of contract, and also about the basis of profit-sharing. As between a non-profit and a with-profit contract for the same group, the net cost to the employer for the latter should, under normal circumstances, be less than under the former; otherwise, there was no choice of the with-profit policy. It had always seemed to him to be justifiable, and common sense, in a scheme containing both life assurance and pensions, that the non-profit variety of life assurance contract should be granted. The two elements thus became compensating, for if mortality were light the profit from the life assurance would offset the higher rate of survivance under the pensions, and *vice versa*. That was a valid explanation to employers who thought that too high a profit was derived from the life assurance, but the explanation did not hold for an unattached group-life policy, where a with-profit contract might well be given. In times of favourable mortality, however, there might well be pressure from the employer of a large group for the profit-sharing formula to be adjusted more and more in his favour. If the office yielded to that pressure, the protection to the office in bad times was minimized; yet, even if an attempt were made to diminish the net cost to the employer, he might well decide after some running experience to operate the scheme himself at less cost and to cancel the arrangement with the office.

Mr A. G. Simons, having first confessed to a feeling of fatherly interest in the paper, said that, looking back over the past twenty or so years during which the business had been developing, there were three things which struck him as being most important.

The first was the very great variation in the rates of interest the offices had used in the calculation of their premium rates. When the business had first started, the offices had used $4\frac{1}{4}$ %, the rate had dropped to 4 %, to $3\frac{3}{4}$ %, to $3\frac{1}{2}$ %, to 3 % and, in the Dalton era, to $2\frac{1}{2}$ %; it had since reverted to 3 %. The lesson to be learned was that the offices should not be in too much of a hurry to pay regard to the actual current rate of interest, but should pay more regard to the long-term trend of the rate.

The second thing that had struck him was the effect that taxation had had on the type of scheme. When the business had first started, every scheme had been automatically submitted under the 1918 Act. As time had gone on, it had been discovered that it was possible to operate an insurance scheme under the 1921 Act, which had formerly been regarded as being solely applicable to private funds; that had started the picking and choosing between the 1921 and 1918 Acts, according to whether the scheme was for staff or works or for both combined. There had since been a greater swing over to the 1921 Act, partly because of the change in life assurance relief, and partly because of the higher rates of tax involved. It was to be hoped, as the author had said, that before long there might be an end of that ridiculous choice.

The third, and perhaps the most important, thing which had come out of the past twenty years had been the over-estimate of the mortality during the deferred period, a matter on which it was urgently necessary to seek the truth. No doubt some offices had tried to do so, but he felt that it was essential that the Institute should proceed as quickly as possible with the preparation of tables from the experience that offices had of group business, and in particular from the experience of mortality during the deferred period. What he had said would link up with some of the remarks of the author, the opener of the discussion and Mr Martin. There were the swings and the roundabouts in the group life and the pensions, and, like Mr Martin, he had found that it was an answer to an employer who drew attention to the profit made on the group life business to turn round and show him the loss (although it was not easy to do so) on the group pensions during the deferred period. He had made an attempt to compare the loss with the profit; anyone else who had done the same thing would no doubt have had a shock in realizing the extent of that loss. It was dangerous to consider group life by itself and to offer a profit-sharing contract where it was linked with group pensions, which was the bigger part of the scheme.

In § III(7) the author drew attention to the non-aggregation of the death benefit and expressed dislike of the method which took away from the employee the right to choose how the benefits were distributed. But there was a lot to be said on the other side. The man was being provided with a death benefit, surely, for the benefit of his widow and dependants; it was usually paid for by the employer, and he did not think there was any hardship in taking away from the man the right to allocate it somewhere else, leaving his widow with no provision whatsoever. Personally, he would go the other way and always insist that the man should have that right taken away from him and that there should be a discretion in favour of some responsible body to decide to whom the benefit should be paid. That was the other means of avoiding aggregation, and he felt it was the better one.

Later in the paper the author referred to the question of early retirement pensions. While he agreed with the author that the early retirement pensions under a group pensions scheme were in many ways inadequate, and there was a lot to be said in favour of increasing them, he was not sure that he would agree with the author in the way he set about it, by attempting to produce an active-service mortality table and from that to provide the full reserve on withdrawal. Surely experience had shown that active-service mortality tables varied from one type of staff to another, and unless there were to be several sets of rates applicable to the different types of employees—which would be impracticable—he felt that it would be dangerous to allow the full reserve, based on an active-service mortality table, in calculating the early retirement pension. In fact, in one of the formulae given in the paper (Case II in § VII) it would be seen that the author had used two separate rates of mortality for the same man at the same age. If early retirement pensions were to be given on a better basis, it was necessary to go about it the other way by deciding how much should be added to the current rates of premium for the extra benefit.

Mr S. H. Cooper confessed to being somewhat puzzled by the author's statement in § V(2) to the effect that a rate of 3 % was appropriate, for the arguments set out in the paper did not seem to take any account whatsoever of the basis of taxation, though he had no doubt that the author had it in mind. He was rather disappointed with that section, for he had expected the author to make some investigation into the basis of current premium rates in relation to taxation and perhaps to consider the effect of an alteration in the tax basis.

In existing circumstances, with the large influx of group deferred annuity business, many offices were in the position where the interest income of the annuity fund exceeded the pension payments, and might continue to do so for a considerable time. He felt that some allowance should, therefore, be made in the rates for income tax.

The most stringent assumption would be that interest was subject to full tax during the deferred period and free of tax thereafter, gross pensions being treated as a liability. Such a basis would clearly be too stringent since a considerable relief of tax must be obtained during the deferred period by the excess of annuity payments under vested annuities over the interest on the relative reserves, but he did not think it would be prudent to value as a liability the net deferred annuity payments after deduction of tax, as had been suggested in a recent paper. To make assumptions regarding future rates of tax in estimating the net interest yield was one thing, but to allow for liabilities after deduction of tax was an entirely different matter. He therefore submitted that a realistic basis would be to allow for a net rate of interest during the deferred period and to make some allowance for the tax saving on vested annuities by taking a rather more liberal view of the rate of interest thereafter.

He had calculated some examples of rates on the following bases:

	Basis (1)	Basis (2)	Basis (3)
'Basic' gross rate of interest assumed	3 %	3½ %	3½ %
Interest rates used in calculation:			
In deferred period	2 %	2¼ %	2¼ %
After retirement	3½ %	4 %	4 %
Pensioners' mortality	*a*(*m*) ult. rated down 2 years		*a*(*m*) ult.
Mortality in deferred period	A 1924–29 Light ult.		
Loading	5 % of each premium		

Examples of the annual premiums (non-returnable at death) to provide a pension of 10 p.a. for a male life at age 65, on the three bases described and also on the basis in general use, were as shown in the following table.

Annual premiums per 10 p.a. pension at 65.

Age at entry	Annual Premium			
	Basis (1)	Basis (2)	Basis (3)	Basis currently in general use
20	1·27	1·14	1·07	·95
30	1·87	1·71	1·61	1·50
40	3·00	2·78	2·62	2·58
50	5·79	5·46	5·15	5·32
60	20·62	19·71	18·58	19·92

He felt that many actuaries would be content, at the time of speaking, to adopt the interest rates of Basis (2), provided there were margins elsewhere in the basis; the mortality assumed for pensioners should, he thought, provide an adequate margin. The premiums on Basis (2) were substantially higher than the rates in current use, except at the advanced ages, and seemed to indicate that the current rates could only be justified by the assumption of a basic rate of interest higher than 3½ % or else by taking a less stringent view of the mortality of pensioners. If the two years' rating down were dispensed with, the general level of current rates might be justified on the higher interest basis suggested, but even then they seemed to be too low at the younger ages.

In § III (7) the author had dealt with the question of aggregation and the possibility of the death benefit being treated as a separate estate for Estate Duty purposes. It seemed to him that many employees might not be happy about an arrangement whereby the disposal of the benefits was left entirely to the discretion of the trustees or the employer, particularly where the life assurance scheme was contributory, as in the income benefit scheme described by the author. Could the trust deed and rules be drafted so as to give the employee the opportunity at the outset of choosing between alternative arrangements for the disposal of the sum assured for the benefit of his dependents? It would not, of course, be possible for the member to alter the terms of the trust after entry into the scheme if the benefit of non-aggregation was to be secured.

The author had gone to some pains to deal with the question of ill-health withdrawals and early-retirement pensions. In those respects life office schemes admittedly compared unfavourably with privately administered schemes, but he wondered whether the desirability of the objective had led the author to adopt a rather uncritical attitude toward the method of attaining it. The warning note on p. 361, about the dangers of basing rates on active-service mortality, might have been stressed. A life office operating a pension scheme quoted guaranteed rates for guaranteed benefits, and it was in a different position from a private pension fund. The actuary to a private fund could normally obtain information about the particular experience; he could, moreover, review the position periodically and recommend such alterations as appeared to be necessary in the light of changing circumstances. The life office, on the other hand, knew little about the particular circumstances of the employment, and its power to amend benefits or contributions was normally limited to new entrants and increments. For a large scheme it might be reasonable to do something on the lines suggested by the author after consultation with the employer and full consideration of the particular circumstances, but he had doubts about the application of the principle to the main body of life office schemes operated for a large number of different employers subject to all sorts and conditions of service.

With regard to the option on withdrawal to effect a whole life or endowment assurance without evidence of health, did the author consider that there should be a transfer of reserve to cover the option against the office?

Mr M. E. Ogborn, in listening to the speakers in the discussion, felt that they had been rather complacent about the disquieting tendencies that had developed over the years in the transaction of deferred annuity business. It seemed to him that the progress of the annuity fund appeared something of a Rake's Progress. Since the author had drawn attention to certain of the problems that had arisen, he thought that was an aspect that should be stressed that night.

In § III(2), the author referred to the fact that it had been formerly the practice to guarantee rates of premium throughout the membership of members entering within a certain period of years. That practice had, of course, terminated, but it did mean that those who had existing business at old and unremunerative scales of premium ought really to incorporate a salary scale in their valuations. That kind of guarantee meant that a salary scale should be associated with the terms which were offered.

In § III(6), there was reference to nationalization as a factor which was never envisaged in the original contracts. If there were a possibility of deferred annuities being given up *en bloc* on termination of the scheme, it was not reasonable to guarantee the return of premiums with interest or even, perhaps, without interest. The money would be taken at a time when it might not be convenient to the office—probably it would not be—and that consideration should be given due weight in the terms allowed on termination of the schemes.

In § V(2), there was the reference to interest which other speakers had criticized; on that subject he preferred the approach of Mr Bayley in *The taxation of annuity funds* (*J.I.A.* LXXVI, 237) which allowed for the tax position of the fund.

On the question of ill-health retirements, he thought that members would all have considerable sympathy with the author in endeavouring to base the premiums for deferred annuities without return on active-service mortality. A possible compromise to deal with the difficulties that had been mentioned might be to use the select mortality of the assured life table though that would perhaps be stringent since the mortality was not applicable to lives in employment.

But their sympathy would not extend to the author's formula in § VII. The author stated that 'investigation has shown that the mortality of early-retirement pensioners is such that whatever the age at which the employee retires he experiences essentially the same mortality as an employee who retires at the normal age'. The speaker did not think that was so. The value at retirement of a pension to a member who retired on account of ill-health was, roughly speaking, independent of the age at retirement and was about equal to the value of an annuity at age 60. It did not depend upon whether the normal retirement age was 60, 65 or 70, and it did not extend to later durations; it was only at the time of retirement; whereas the formula in Case I assumed that, if the member retired on account of ill-health at age x, the mortality t years later would be the same as the mortality at the normal retirement age plus t. He did not agree with that assumption.

The features to which he had referred at the beginning of his remarks, and which he found disquieting, led him to think that a new approach was needed to pension scheme business. It seemed to him that to transact pension scheme business on a large scale on a non-participating basis was wrong. When life assurance had first started, there had been many factors which could not be foreseen and it had become the custom to charge premiums which were likely to be more than adequate in all foreseeable circumstances and to give the assured the right to participate in the profits by way of compensation.

Looking at pension scheme business, he could not feel that the factors were any more foreseeable than for life assurance. Mortality was more difficult to assess than for life assurance; so was interest; and the contracts were for longer periods. Therefore, he felt that offices ought to get away from the transaction of large amounts of non-participating pension scheme business and to put it on to a participating basis. He admitted that that course might not be popular with employers, at least until the scheme had got under way, and he admitted that there would be many difficulties to be overcome; but he thought that actuaries should not run away from those difficulties—they ought to tackle them.

Mr M. D. W. Elphinstone thought that it was not absolutely clear what kind of scheme the author was talking about.

There were two distinguishing features of what were commonly called group schemes. The first was an administrative one pure and simple, that one policy, or at most two, were issued instead of one or two policies on every single member of the scheme. The second feature was an actuarial one and was summed up in the phrase, the group single-premium basis.

If the author had produced his paper fifteen years earlier, he would have been severely criticized by a large number of members, including some of great eminence, for advocating something that was unsound. Fortunately, that word had not been heard yet in the discussion. But the 'rising cost' feature was still talked about. The estimates that offices made had, he thought, almost invariably been over-estimates of future cost, and nobody had been disappointed—except those offices who quoted for the same schemes on a falling annual premium cost at the outset and who did not secure the business. However, there was a danger in the rising cost. In fact, the gloomy prophecies had been made on assumptions that had not been borne out in practice, and he could not see how anybody had ever expected them to be borne out in practice; but with the average age of the population steadily rising, the rising cost might have been only postponed. He thought this was the one single fault of the ordinary single-premium group pension scheme as opposed to almost any other scheme.

There was another risk that was shared with almost every other kind of scheme—the risk of salaries increasing and inflation going on. The group single-premium basis could not produce anything better than an average salary scheme. Most employers looked for final salary schemes; they did not understand the danger they were running into on the subject of cost, but they did understand the danger that a pension scheme would be useless if when members came to retirement the pensions were based on average salaries.

The biggest danger of the whole pension scheme business was not whether interest rates were going to be adequate, or whether mortality for people who took particular options was soundly assessed; the danger was that the pensions would in fact be inadequate, and that applied to every way of funding a scheme that there was.

There was a special responsibility on the trustees of private funds and on the offices which maintained a large volume of pension business. They, more than any other body of people, were interested in maintaining the value of money, because life assurance generally consisted of money contracts whereas pension schemes were provision for old age; some means had to be found of making sure that the pensions were in fact adequate. It followed that the money should be invested so far as possible in a way that encouraged the formation of capital rather than the production of consumer goods; however, that was perhaps a counsel of perfection.

When a more stable economic condition was reached, and the risk of inflation receded, he thought there would be a tendency for life offices to abandon the single-premium group pension scheme—the average salary scheme—and to promote and underwrite final salary schemes. That should be no more than a matter of actuarial ingenuity. The risk would still remain of inflation or deflation, and something had got to be done about it. That brought him to what the last speaker had mentioned—with profits.

He thought that, in an Institute discussion, he had seldom heard anything with which he was more wholeheartedly in agreement than Mr Ogborn's closing remarks. Mortality was extremely difficult to assess; so was interest; and the contracts were very long-term ones. It would be unfortunate if an office made large profits, for large profits would lay the offices more and more open to political attack of the sort that had already begun.

The answer seemed to be to introduce either a conventional bonus depending upon the discretion of the directors or some form of profit-sharing formula. Two attempts had been made by offices in the United Kingdom to write deferred annuities in some form or another with profits. One, to the cost of his own office, was having some current success.

On the question of profit-sharing group life assurance, he did not think that Mr Simons's answer could always be readily given. There was the easy retort: 'Why on earth do you do your pensions business at a loss? Why do you go on so actively seeking it if you are doing it at a loss? I can see the enormous profits you are making out of group life assurance, but I do not see why you go on doing this enormous pensions business at a loss and go on looking for more of it.'

Speaking for himself, he thought that the current rates were adequate; an office which thought so should be ready to transact pensions schemes on those rates without life assurance. If it was prepared to do that, there could be no objection to giving a profit-sharing formula on the life assurance—but the difficulty was to assess the mortality.

Mr H. E. Raynes said that the paper under discussion and the previous paper by Mr Simons together provided a survey of the principles and the technique of group business, which would be of considerable use. When the business had been started about twenty years previously, all the troubles ahead had, naturally, not been foreseen. There were a few things to which he wished to refer.

First, it was perhaps unwise to have differentiated between the tables of premiums for the employer's contributions and those of the employee. Had both of them been placed on the same table, with return without interest, the procedure would have been simplified, a lot of trouble would have been avoided, and the scheme would have been more easily grasped by the public.

The author suggested the adoption of active-service mortality. The resulting premium rates would more nearly approximate to the employee's rate of premium based on 'with return without interest', and would justify the latter for the contributions from both sides.

Another source of difficulty had been the rather optimistic guarantee which had been given of the rates of premium—that the rates should hold throughout the duration of a member's service and should extend to increments in salary. That was a generous option, and it had meant that the current cost of some older schemes involved the use of three different tables of rates. The offices had been victims of their own generosity and the unexpected fluctuations in the rate of interest on long-term investments. For a period offices had come down to rates based on $2\frac{1}{2}\%$ interest, but he had himself thought that this was a little on the cautious side, even at the time of Dalton. When the rate of interest began to rise again, there had been pressure towards the adoption of a more favourable rate of interest, and the rate had been increased; but before doing so the offices had considered whether it was not possible to adhere to the old $2\frac{1}{2}\%$ rate with some sort of profit formula. He had put forward a formula and there had been a certain amount of support for it. The Government issued an annuity based on the price of $2\frac{1}{2}\%$ Consols. Why should not the offices do so? The $2\frac{1}{2}\%$ single premiums for group pensions could have remained in force, a rebate being made each year, on the premiums for the year, based on the average price of $2\frac{1}{2}\%$ Consols. That would give a relief to the employer while safeguarding the office against the danger of a fall in the rate of interest.

He hoped that those who were transacting group business would not get hide-bound in thought and practice, that they would keep their minds open to further experiments and ideas, some of which might perhaps come from across the water. There was a tendency in the United States to have a deposit system of pensions, i.e., the fund was maintained as a trust fund by the office at a rate of interest (which might again be based on the rate of interest on long-term loans) and not applied to the purchase of the annuity until the member either retired or withdrew taking a deferred annuity benefit. A system of that sort had considerable advantages. The fund would secure the profit, or bear the loss, arising from variations in the withdrawal and service-mortality of experience, yet members and employers could feel that their scheme was administered by the insurance company with a guarantee of rates of annuity when pensions became payable. He did not know how successful or widespread that system was in America, but he knew that it was being done by some of the larger offices there.

Mr H. P. Clay referred to Mr Raynes, who had contributed more than anyone else to the successful transaction of group business in the past twenty years.

Mr Elphinstone had already said that the paper contained no reference to the way in which single premium pension costs had been supposed in 1928 and onwards to be going to rise and rise. He agreed with Mr Elphinstone that many of the people who had talked about the rising costs of single-premium pension schemes had been proved wrong.

The system of deposit administration in the United States, which Mr Raynes had mentioned, was a rash that had broken out in a small way over twenty years earlier; it had reappeared lately on a much larger scale. He had even heard rumours that it existed in Great Britain. As he understood it, the insurance company looked after the investment of the funds until the funds were used to buy the pensions coming into force, so that the employer bore the mortality risk up to retirement and the insurance company bore the investment risk only. Was that a satisfactory division of their responsibilities and one which left each with the field in which he had chosen by experience, examination, and so forth, to qualify himself? He had not been in favour of it as a theory more than twenty years ago and he had since seen some of its results.

There should be a selection of employers. If a life office was to be concerned with a pensions scheme which was to work properly for the employer and the life office, it had to be an exceedingly long-term contract, almost an indissoluble marriage, with a great deal of give and take, understanding, appreciation and fellow-feeling on both sides. There had been an influx of group business in the past five years; he hoped that he was wrong in fearing that there would be adverse results from the lack of selection of the employer.

When an individual proposer effected a life assurance policy, the office knew with whom it was dealing. When a group scheme was set up, the original negotiation was made with somebody representing the employer, but later a second person came into view—perhaps the secretary of the company—who maintained the records and administered the scheme. Those two persons changed. Probably every five years, on the average, it was necessary to talk either to a different man who could buy, representing the employer, or to a different man who administered the scheme. A process of assimilation was necessary so that there should continue to be understanding between the employer and the life office.

He felt that the long-term character of the arrangement needed to be emphasized and that profit-sharing should not arise by any formula agreed in advance but should happen gradually over the years by the equitable use of the life office's right to charge different rates for new employees. In such an arrangement, there was quite an amount of latitude—enough to get over most difficulties, if the contract was regarded as one between two honest people who intended to see each other's point of view and to co-operate for a long period of years.

Mr H. A. R. Barnett recalled that he had, in a paper in *J.I.A.* LXXVII, 15, appealed for mortality investigations to be based on lives rather than on policies; though the author had covered himself by suggesting an investigation based on lives, he had also suggested one based on units of pension benefit. The author would not solve the problems of heterogeneity in that way. The lives could be divided into some class groups, according to the type of life involved, the type of employment, or broad salary groupings; but bringing in the units of pension benefit would, in effect, mean an arbitrary weighting of the mortality —arbitrary because different employers might have different ideas about the number of units of pension benefit appropriate to each type of employee—and a solution of the problem would be no nearer. He wished to put on record his strong disagreement with the first complete paragraph on p. 357.

Mr J. H. Kitton, in closing the discussion, referred to the 'non-aggregation' method of drawing up a contract, mentioned in § III (7) of the paper, to which there had been reference by Mr Simons and other speakers. There was a strong administrative reason in favour of giving to the employer or to a trustee the disposition of a non-contributory death-in-service benefit. In a case in his practical experience, an employee died after many years of faithful service, and unfortunately left two wives; his legal wife had been in an asylum practically since marriage, and his housekeeper had gradually assumed the position of wife, bearing his children and living as a faithful and normal wife would have done. Had the disposition of the benefit followed the laws of intestacy, most of the benefit would have flowed to the State as the guardian of the insane wife; but the employer had had the power of disposal, with the result that the benefit had gone where it seemed to be most deserved.

On the other hand, some employers preferred that such a benefit should not be subject to disposition by the employer or the trustee because the disposer bore the onus of making awkward decisions. Those two considerations should be borne in mind.

Much had been said in the discussion on the question of investigating mortality in various ways, in various groups and in various subdivisions. He felt that they should keep carefully in mind two or three salient considerations. One was the essential difference between the private fund and the insurance scheme. It had been mentioned that the private fund had a resilience which the insurance scheme could not have. The private fund had an actuarial valuation usually every five years, and contributions and benefits could, if necessary, be altered even in respect of existing members of the fund. Consequently, there was something to be said for following as closely as possible the actual experience of the body of lives for which the fund catered. The distinctive feature of the insurance scheme was the guarantee of benefits and contributions. True, it was no longer the practice to guarantee rates of contribution for new entrants and for salary increments to the same extent as formerly, a change in practice with which he was fully in agreement; but it was customary to guarantee the basis of contributions for known benefits. That meant that the calculations should contain margins, and the practices of the private fund should not be slavishly followed.

The 'swings and roundabouts' which had already been mentioned ought to be borne in mind. Group life business did form some sort of compensation to group pensions business in the period up to age 65, or other normal pension age; and when the two were written together, it was perhaps possible to dispense with some of the margins which were required when those kinds of business were transacted separately. Consequently, the with profit approach seemed to be more necessary when group pension business was written separately from group life business than when the two were combined.

The fact should also be stressed that over many decades mortality had steadily improved—an improvement which had paid the offices well in respect of life assurance, but not for pension insurance business. More particularly were the offices concerned with the after-pension-age mortality in that class of business. It was usual to make some allowance for improvement. Though it could not be known what that improvement was going to be, the assured life experience over the past twenty-four years showed that there had been an enormous improvement.

What, he felt, were wanted from the Institute were a few mortality experiences on a basis as up-to-date and as wide as possible, without too many fine distinctions. If the Institute were to attempt to publish 'active-service' mortality tables, there might be a tendency to adopt them as standards and to use them for schemes for which they were inappropriate. He felt, therefore, that the Institute's investigation of pensioners' mortality was what was wanted quickly. There might, perhaps, be quite a strong case for investigating 'late retirement' pension mortality separately, and he thought that a case had also been made for the investigation of pensioners' mortality by *amounts* as well as by lives. What should be avoided was too much splitting up and an attempt by the Institute to publish too many 'standard' mortality tables.

The President (Mr F. A. A. Menzler, C.B.E.), in proposing a vote of thanks to the author, said that the paper gave an admirable and thorough survey of current professional practice, in a particular field, of a kind of which they could not have too many. The discussion had ranged very widely and had been none the less interesting for that.

In the second paragraph of the paper, the author said that the only paper appearing in the *Journal* on the subject of group insurance was that by Mr Simons in 1942. Unfortunately, the President said, he was old enough to remember hearing the first paper on group insurance delivered by Mr McCormack in 1919 (*J.I.A.* LI, 313). At that time the paper had been mainly concerned with group life insurance; and it was not without interest and indeed entertainment—as showing the evolution of thought with the passage of years—to read what Sir Alfred Watson had said in those days about group life insurance. Sir Alfred's remarks had indeed been scathing, and he had received a good deal of influential support.

Mr McCormack, in that paper, had referred rather interestingly to a group insurance policy effected by a New York bank which included the following benefits: one year's salary in the event of death during service; in the event of total disablement payments during the continuance of the disability of

100% of salary for the first month,
80% for the next eleven months, and
60% thereafter;

and at the age of 65 a pension of 2% of the aggregate salary throughout service. Mr McCormack had remarked with considerable prevision that such policies were rare but that they might foreshadow a development of the system which would increase its importance as a social factor.

There had been such developments, but he supposed it would be generally agreed that there was one respect in which the schemes under discussion were at a marked disadvantage compared with private internal funds, namely the provision in the event of break-down in health. Mr Raynes had appealed to members not to be hidebound, and another speaker had suggested the possibility of final salary schemes; so they should not lose hope that the offices together would be able to solve the problem of break-down pensions.

He wished to make one other reference of a general character to what, he suggested, should be characteristic of all superannuation schemes, whether group or private—namely, the need for arrangements to ensure the transferability of accrued pension rights when an employee goes from one form of employment to another. The days had surely gone when one of the primary arguments in favour of a pension scheme was that it would chain the employee to a particular employment. That argument ignored his uitability to the employment. For the increased efficiency which was so urgently ıeeded in all walks of life, people should be able to move freely, without loss of benefit, vherever their abilities and aptitudes might take them.

Mr G. W. Pingstone, in reply, referred to the question of group life assurance on ı profit-sharing basis. Though the theoretical basis propounded by the opener was of :onsiderable interest, it did not make allowance for the usual fluctuations in mortality 'rom year to year, which far exceeded those to be expected from the normal curve of ɜrror, nor for the results of epidemics such as had been experienced in the past three nonths and which might not be so rare as in the recent past.

An essential prerequisite of any such basis for profit-sharing appeared to be the preservation of a considerable margin for variations of that kind: and the size of the group should be such that a reasonable mortality average might be expected over a period of, say, five years. The fluctuations to be expected in mortality from year to year rendered it clearly desirable to make the full return only over a period of several years even for the largest groups.

If war risks were covered under the scheme, the charge for those risks would have to be excluded from the formula for calculating the return in order that the appropriate contingency reserve could be accumulated.

The foregoing remarks indicated that the suggested basis of profit-sharing could not apply to smaller groups, and in order that those groups could be charged equitable rates for non-participating group-life assurance, a full investigation of active-service mortality would clearly be essential.

The suggested basis of profit-sharing also seemed to require a fairly accurate assessment of the occupational hazard, at least for broad industrial groups, and the investigation proposed in the paper would therefore, in his view, be equally essential. It seemed to him, indeed, that such an investigation should precede the general adoption of any such basis of profit-sharing for larger groups.

As stated in the paper, group life assurance, in Great Britain, had mainly been sold in conjunction with group pensions and, provided the same basis for mortality in active service underlay the rates of premium for both types of benefit, a mortality profit in respect of group life assurance would be a mortality loss in respect of group pensions.

In discussing the development of life office pension schemes, he felt that the opener had overlooked the fact that group life and pension schemes had been introduced into the United Kingdom by an American office in 1928, so that their early development had taken place in the years immediately following the 1931 financial crisis. If asked to ascribe reasons for the lines on which such schemes had developed, he thought it would be more accurate to point to that history and to the single premium method of costing, which was a unique feature of such schemes and enabled pension schemes to be sold to employers at a time of acute financial stringency. Also, from the point of view of the life office, the merits of the group method of administration should not be overlooked.

He was glad that the opener had stressed that the annuity funds of many offices were the 'wrong way round', a circumstance which should be borne in mind in connexion with the remarks in § V(2).

On the subject of mortality investigation, he quite agreed that there would be some difficulty in obtaining from offices the returns for the proposed investigations, but it had been done in America and should not be impossible in Britain. He disagreed strongly with the suggestion that, because use might not be made of a certain subdivision of data, the returns should not permit of it. Surely if actuaries had any claim to be scientific in their work, they should decide such questions when the results become available and meanwhile draw on experience to indicate suitable subdivisions for the collection of data.

The data being contributed to the continuous investigation of the mortality of pensioners were so limited that the results could never be of any real practical value. As he had mentioned in his opening remarks, the mortality by amounts was an exact reflection of financial experience and, if there was a 10% difference between the mortality by amounts and by lives, he did not think that it could be ignored. The argument also applied to mortality during the deferred period. He thought that there was rather more ground for his suggestion of an investigation based on units of pension benefit as well as on lives than one speaker had been willing to accord it. True, in America the investigation of mortality by amounts had been abandoned and the investigation of mortality during the deferred period had been made by lives only. Some weighting of the mortality by amounts would be an advantage and effectively there was not much difference between the customary graduation of the scale of pension benefits and that of life assurance benefits, although the former was, admittedly, usually steeper.

In his opening remarks he had tried to emphasize the problem which the treatment of ill-health withdrawals presented both in mortality investigations and in premium rates. The suggested use of active-service mortality was a possible solution of the problem which merited serious consideration. But other solutions which had been suggested had occurred to him and he had deliberately chosen the most provocative solution to bring out more clearly the fundamental problem.

Mr Simons had suggested that non-aggregation was not a hardship to the individual when the employer paid the premiums. He admitted that there was some force in that argument, but recently his office had had to deal with a large industrial concern which decided against a non-aggregable death benefit for employees earning under £700 p.a. He felt that his remarks about non-aggregation not being always suitable had some real force in actual practice.

He had been criticized for using two different mortality tables in a single formula in § VII of the paper. Essentially the formula was in two parts. If the second item in the denominator were excluded, the formula represented the reserve in hand for each member at a particular point of time. That reserve was available for the benefit of an ill-health withdrawal, and it was perfectly sound, so far as he could see, to use the reserve for the purchase of an annuity according to the actual mortality of the early retirements—as he had done in Case II.

Another speaker had questioned his statement in § VII about the mortality of early-retirement pensioners. He regretted that the position was not clearly stated in the paper; the statement was intended to be part of the assumptions. He was not saying that it was an actual fact.

He had been asked whether any transfer of reserves was necessary where an individual took an endowment or whole life policy on leaving service under the usual continuation option. There clearly was an extra risk. In America, extensive investigations had been made, and it was usual to charge the group fund with an appropriate single premium in respect of the individual contract. The system was elaborate and the amount charged depended on the type of contract in question.

Mr Ogborn had referred to nationalization; the position was that legislation had been passed overriding private contracts, and that was the real question at issue. Contracts were entered into in all good faith between two parties, and then Parliamentary and delegated legislation decreed that the contracts were to be torn up.

Participating pension schemes posed a very real problem. So much lay in the future, it was difficult to know how much could properly be distributed during the deferred period. He was not sure whether Mr Ogborn had in mind individual contracts where perhaps there was a lump sum at normal pension date, but in respect of group schemes care would be necessary in determining how much could safely be distributed from time to time.

He would enlarge on one statement which Mr Elphinstone had made because he thought that, taken literally, it was highly dangerous. Mr Elphinstone had said that the biggest danger was not from mortality or interest, but that the schemes might provide inadequate pensions. He agreed entirely from the point of view of the economy as a whole, but life offices were surely concerned much more with mortality, interest and expenses as affecting their own financial solvency.

Miss C. A. Langdon had kindly furnished him with some comments which he thought might be mentioned very briefly in order to make the paper more complete.

The first was that, at the change of life assurance rates in 1947, the loading for the inclusion of total permanent disablement benefit had been increased from 5% to $7\frac{1}{2}$%.

The second was that it had become the general custom to give the additional or 'continuation' option, i.e., the right to effect an individual policy on leaving service before attaining the age of 60.

Thirdly, the paper might have emphasized that war risks were still excluded except where an extra premium was specially charged for them.

Last, it was suggested that in the mortality investigation it would be useful to lay down certain standard conditions to which a scheme should conform if its data were to be included. That was a valuable suggestion, and if, as he hoped, the matter was pursued, he thought it would be a fruitful subject for thought.

The following written communications have been received.

Mr R. D. Clarke writes:

The author has put forward a number of proposals for the investigation of the mortality experience of group life and pension schemes and with many of these proposals I find myself in agreement. However, I would join Mr Barnett in protesting against the suggestion of investigating mortality on the basis of amounts. No one will seriously doubt the author's assertion that mortality varies by size of sum assured or pension. But the reason for this variation lies in the different levels of benefit enjoyed by different classes of life. Managers have lighter mortality than works staff; they also enjoy larger pensions. Surely the correct method of approach is the one which Mr Pingstone has in fact put forward in another paragraph of his paper, viz. to subdivide the experience by class of life: executive staff, clerical staff, non-hazardous works staff and hazardous works staff—or such other classification as may be thought suitable. If this is done—and it should be done both for active employees and for pensioners—the variation of mortality with size of benefit should be largely, if not wholly, eliminated.

As Mr Barnett pointed out, the investigation of mortality by amounts is equivalent to weighting the lives exposed with an arbitrary series of weights. It presents us with a problem similar in kind (but far worse in degree) to that of duplicate policies in an assured life experience. The probability distribution of the emerging death-rate is obscured and the normal significance tests are rendered valueless. If there should be an exceptionally large death claim in a particular year, the emerging value of q_x at the relevant age would be inflated and an awkward hump would appear in the curve which would be difficult to eliminate in graduation. In short, when mortality is investigated by amounts, probability theory becomes unmanageable and has to be abandoned. As a result we may often be unable to judge whether an observed deviation is significant or whether it may be regarded merely as a random fluctuation. I feel convinced, therefore, that the only scientific solution to this problem is to subdivide the data according to class of life and to make the investigation by 'lives'.

In the investigation of pensioners' mortality, I agree with the author's plea for a separation between normal and late retirements. Is not this virtually achieved, however, by his proposal that pensioners' mortality should be examined on a select basis? It seems probable that the mortality of pensioners is a function both of age and of duration and that the select basis is the right approach. But a select investigation automatically secures that pensioners retiring at, say, age 68 are not immediately merged with those of the same age who retired one, two or three years earlier and thus the late retirements are appropriately segregated from their brethren who retire at the normal age.

Mr Elphinstone has written by way of supplementing his remarks at the meeting:

I drew a distinction between the administrative peculiarity of the single policy and the actual peculiarity of the 'single premium basis', but dwelt only on the latter. Figures comparable to Mr Pingstone's for individual policy schemes are probably hard to obtain, but I doubt whether they would show such an advance as group business, if the special schemes for senior executives are excluded.

To conduct any class of pensions business properly, there must be the determination to make the scheme work, and work well; all the little day-to-day decisions must be made against the background of this determination, not against the background of 'the practice of the office'. This may well be the most compelling reason why offices form separate pensions departments, even to handle individual policy schemes. To use a special technique helps greatly; moreover, the group technique avoids many difficulties by confining routine work to recording facts, without altering or creating documents of title.

Mortality varies unexpectedly from scheme to scheme, and I doubt the value of mortality investigation in predetermined groups. The object of the first investigation should be to discover the suitable groups. Of those which Mr Pingstone has suggested, I suspect that it no longer matters whether a scheme covers staff employees only, works employees only, or both. For all the criticism it has received, the National Health Service is the service to which both must now look for maintenance of health. Again, I doubt the value of his broad industrial groups. In an industry with which an industrial disease is associated the most careful precautions are taken to protect the health of the employees. Mr Pingstone himself is troubled by the heterogeneity of the data and suggests that investigations should be by amounts as well as lives. I cannot help feeling that investigations of the type which he recommends would add little to the more intimate knowledge already existing in the pensions departments of the offices principally concerned. I would favour an investigation by schemes, starting with the larger ones which can exhibit in a few years their own peculiarities of mortality. With the co-operation of the employers, an intensive search could then be made for the reasons for these peculiarities. I think that such investigations would be more likely to yield valuable information than large-scale investigations of the classical type.

Mr G. F. Stout writes:

In § V(4) of the paper, under the heading *Life assurance*, the opinion is expressed that active-service mortality was lighter in the author's own office during 1948–49 than that expected by the A 1924–29 ultimate table (the premium basis), judging by the amounts of 'expected' and 'actual' pension reserves released by death. It is not clear whether account was also taken of 'actual' pension reserves released by ill-health withdrawal, but in § VI(3) it is recorded that in the first American investigation it was only by treating ill-health withdrawals as deaths that the experience in the deferred period justified the basis of premium rates and reserves. At that time, moreover, the American offices were adhering to the condition that no premiums which would be forfeit on death would be returned on ill-health withdrawal.

The 'roundabouts and swings' have always had an appeal to writers on the subject of group life and pension schemes. The general trend of results in my own office, and certain small investigations of individual schemes, support the view that—at least as regards mortality—the losses are usually on the pension side of the business. Therefore an *ex gratia* payment under any of the palliatives mentioned by the author for the treatment in practice of ill-health withdrawals may well be made out of inadequate reserves. Moreover, there can be no question of withdrawing the life assurance continuation option, which is available up to age 60, as a condition of a special arrangement between the assurer and the employer or trustee.

If the A 1924–29 table were abandoned in favour of true active-service mortality, deriving values of q_x from deaths in service and from cases of admitted disablement claims in which death occurred within two years of first absence as the author suggests, it would in theory be possible to grant normal surrender values on ill-health withdrawal out of the higher reserves which would be available, but there is no doubt that the offices would be opening the door to a quite legitimate form of selection on the part of employers.

The popularity of the rising cost method for future service pensions and indefinite funding for past service pensions tends to concentrate the age-distribution of 'non-return' pension reserves at the higher ages. Employers, naturally anxious to do the best they could for break-down cases, would for the younger men be inclined to preserve the life assurance and disablement cover under the scheme for the maximum period of two years. Thereafter, if the member survived, but a disablement claim had not been admitted, there would still be the life assurance continuation option (without disablement benefit) and the normal pension surrender value. This latter, although arising from contributions by employer and employee, could be passed wholly to the employee, in the form of a commutation of an early-retirement pension. Such a pension can be allowed at any age on medical grounds, not only in the last ten years of membership, and can always be commuted in cases of serious ill health, as to which the discretion lies with the employer or trustees. However generous early retirement pensions might become, the offices would probably not guarantee a return equal to the surrender value.

Conversely, where the member was over 60 at the date of breakdown, any disablement cover, as well as the life assurance continuation option, would have expired and the 'non-return' pension surrender value might well be more than the sum assured; the member would then be withdrawn from the scheme with all speed.

In addition to the distortion of the results of investigations which these options against the offices would cause, the cost could be substantial. In my own office, for example, among schemes involving non-return premiums and group life assurance but with very diverse benefits and costed by a variety of methods, the proportion of active-service deaths over age 60 during 1948–49 where the pension reserve released exceeded the sum assured has been found to be just over a quarter. It was convenient to use the figures for pension reserve released rather than normal surrender value, but this does not necessarily vitiate the result if it is conceded that existing premium rates and reserves are too low.

Mr Pingstone has written as follows in amplification of his reply to the discussion.

As Mr Raynes and Mr Martin indicated, a solution of the problem of ill-health withdrawals so far as new schemes are concerned could be found by making both the employer's and employees' contributions returnable on death. After giving the matter considerable thought, however, I came to the conclusion that the use of true active-service mortality was a more practical solution for the following reasons:

(*a*) It would appear from some calculations which I made that the rates of premium using true active-service mortality could be about mid-way between rates calculated on the basis of return without interest on death (R.N.I. basis) and those calculated on the basis of no return on death or withdrawal in ill health (N.R. basis). They would be much cheaper for the employer than rates calculated at pure interest only (R.W.I. basis) especially because employee's contributions are usually applied on the R.N.I. basis, and if the R.W.I. basis were adopted for the employer's premiums it would clearly have to be adopted for the employees' contributions also.

(*b*) In order to secure the approval of the Inland Revenue authorities, it would seem to be necessary for 1918-Act schemes to provide that any return of the employer's pension premiums on death would be paid to the deceased's estate or for the benefit of his dependents. The placing of the employer's premiums on the R.N.I. or R.W.I. basis would, therefore, mean in effect that the employer was paying a considerable extra cost in order to provide an additional death benefit of uncertain amount and bearing no definite relation to either salary or needs.

(*c*) It appeared to me desirable to retain the mortality feature in the pension rates to preserve the compensating effect so obtained between group life assurance and group pensions when the two are, as is usual in this country, tied together.

It may be useful to give some further brief details of the system of 'deposit administration' mentioned by Mr Raynes.

Essentially, the scheme is a private superannuation fund with the special features that its only investment is a deposit at a guaranteed rate of interest with an assurance company, and that the fund is tied to that company for the purchase of all annuities as they arise at guaranteed rates. The scheme may be either contributory or non-contributory.

At the outset, and at regular intervals thereafter, rates of contribution are calculated in exactly the same way as for a normal private fund and the assurance company guarantees the rate of interest in respect of amounts deposited which are not in excess of the rates of contribution so determined until such time as they are used in the purchase of immediate annuities. Initially, the interest guarantee applies to all sums deposited in the first five years and the guarantee of annuity rates to all annuities purchased by such deposits.

As practised in America, the 'deposit administration' system seems to represent an effort on the part of offices transacting group business to minimize the true cost of providing pensions for large groups of employees. Originally it was considered suitable only for groups of over 1500 lives and, although business has since been written on this basis for groups of as few as 500 lives, the main use has been in connexion with a number of very large groups of employees for whom pension schemes have been introduced in the last few years as the result of trade union bargaining with employers.

There would appear to be no reason why a pension scheme on the 'deposit administration' basis should not be tied with a group life assurance scheme so that the combined contract would not be purely a guaranteed investment, but the compensating effect mentioned in (*c*) above would be lost. For this reason, and because it would be applicable to schemes of all sizes, I considered that the use of true active-service mortality was a better solution of the particular problem of ill-health withdrawals.

My remarks on the subdivision of the data for the suggested mortality investigations seem to have given rise to an erroneous impression that I envisaged a multiplicity of 'active-service' tables. I had in mind that, having regard to the apparent absence of other suitable data, the subdivisions by broad industrial groups etc. would be used to determine which groups could be considered non-hazardous and taken, as suggested by Mr Martin, and as actually done in America, to form the basis of a standard table. The investigations would indicate the relative mortality of the more hazardous groups and hence the loading necessary for group life assurance where granted without pension benefits; where pension and life assurance benefits are granted together it is likely that part or all of the loading could be waived by reason of the compensating effects of mortality on the two benefits.

If pension premiums were calculated on the basis of the active-service mortality of the non-hazardous occupations, there would appear to be no danger in allowing, for more hazardous occupations, the normal surrender value in cases of ill-health withdrawal and improved pensions based on the normal reserve in cases of early retirement. Thus there is not really any difference of opinion between Mr Simons and myself on the question of improved early retirement pensions.

In the light of the foregoing explanations, it would appear that the early inauguration of mortality investigations on some such lines as I had in mind would receive support from a number of the leading offices.

With regard to Mr Ogborn's remarks on the mortality of early retirement pensioners it is interesting to note the results derived by the Government Actuary from a recent investigation into the mortality of teachers who retired early (House of Commons Paper No. 128 of 1951).

Since the discussion on my paper took place, the Millard Tucker (No. 1) Committee has published its *Report*. In paragraph 315 it recommends that the discrimination between private and insured 1921-Act schemes in the matter of tax-free interest, to which reference is made in the second paragraph of section VIII of my paper, should be removed. It has to be borne in mind, however, that the Royal Commission on Taxation appointed in January 1951 and the Millard Tucker (No. 2) Committee are still sitting and that no legislation to give effect to the recommendation is at present in sight.

Since the meeting most offices transacting group business have intimated that in respect of new schemes their standard group life assurance rates are to be reduced by 2% at all ages. The new rates will produce a cost for a normal group equal to (*a*) some 90% of the cost on the rates which were adopted generally in 1947 or (*b*) some 75% of what the cost would have been on the rates in general use prior to 1947.

The addition for the inclusion of the total and permanent disablement benefit is to emain at $7\frac{1}{2}\%$, and war risks will continue to be excluded except where an extra remium is specially charged to cover them.

Although professing to support the scientific approach to mortality investigation in espect of group business it appears to me that Mr Elphinstone's views on the sub-ivisions of the data are completely unscientific. He is apparently prepared to assume hat because both staff and works employees will be provided with medical attention y the same National Health Service there will be no significant differences between he mortality of the two types of employee, despite *inter alia* the essentially different onditions in which they often work—as, for example, in tanneries, foundries and sbestos plants.

In my view the scientific approach would allow such conclusions to be reached only s the result of full and unbiased analysis of the facts and for this investigations on he lines which I proposed would clearly be essential.

The object of the proposed mortality investigations was to arrive at more equitable remiums and to simplify the underwriting of the business as a whole. I find it hard o believe that these objects would be achieved by investigations on the lines which Mr Elphinstone advocates. I should have thought that 'the more intimate knowledge' o which he refers would have been based on such investigations and that the most ikely result of the 'intensive search' would be to remove some of the causes of excess nortality in particular schemes, thereby rendering past experience an unreliable guide o the future. The investigation of the experience of a limited number of schemes, however large in themselves, would not provide the broad basis necessary to achieve he objects in mind.

The practice of offices transacting group business is to see that, as far as possible, employees receive the maximum benefit from the provisions for continuation of member-ship in cases of ill health and the life assurance continuation option, but to the extent hat these rights might be exercised more fully, pension premiums based on true ctive-service mortality derived from past experience would contain a margin and there would therefore be no question of an option against the office as Mr Stout appears to suggest.

In considering the case where the surrender value of the employer's premiums exceeds the life assurance benefit Mr Stout appears to have overlooked that the employer could not obtain the surrender value unless the employee agreed to withdraw in such a manner as would give him no right to the benefit of the employer's premiums and that, even if the employer went so far as to approach the employee with an offer designed to secure such agreement, the latter might still prefer his pension rights under the scheme. In so far as early-retirement pensions are improved this latter possibility is moreover increased. The real option presented to the employer is therefore not nearly so serious as Mr Stout's remarks would suggest and certainly not in my view such as to outweigh the great practical advantages of using true active-service mortality in the calculation of premium rates, providing that reasonable precautions are taken as sug-gested in the paper.