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TWENTY-YEAR POLICYHOLDER COST COMPARISONS AMONG ORDINARY INSURANCE PLANS

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ABSTRACT

This paper shows how the following may be *rapidly* calculated, with appropriate allowance for income tax:

1. The twenty-year illustrative yield (i.e., yield based on dividend illustrations) on the extra funds that a policyholder places in a higher-premium plan in excess of those required by a lower-premium one.

2. Twenty-year costs for policies already in force, with an example of the calculation of comparative costs under a replacement proposal (including the illustrative yield obtained by continuation of the present policy).

3. The twenty-year illustrative yield of a permanent plan over nonparticipating, five-year renewable term insurance (without accumulation of funds), both when neither plan is yet issued and when the term insurance is proposed as a replacement, with worked examples. (A fund-accumulation method is also formulated and used to test the accuracy of the shorter method.)

4. The effect of changes in dividend scale, with special reference to the yield of a permanent plan over nonparticipating, five-year renewable term insurance.

While the main emphasis of the paper is on twenty-year costs and illustrative yields, the relative cost of early withdrawal and the most perspicuous way in which this can be presented to the policyholder are also considered.

THIS paper shows how twenty-year policyholder cost comparisons can be rapidly made among life insurance policies that differ in plan or initial policy duration or both. The methods developed are applications and extensions of the method for obtaining policyholder costs presented in the paper "A Fast, More Meaningful Twenty-Year Net Cost Formula" (hereinafter referred to as "Paper I").

Section I of the paper describes how the twenty-year "illustrative yield" (i.e., yield based on dividend illustrations) can be calculated on the

extra funds that a policyholder places in a higher-premium plan in excess of those required by a lower-premium one.

Section II shows how twenty-year costs can be calculated for a policy that has been in force for one or more years. An illustration of the application of the method to the comparison of costs under a replacement proposal is given.

It is possible to adapt the proposed cost formulas to plans with premiums that are not level by utilizing appropriate factors. The most widely sold of such plans is nonparticipating, five-year renewable term insurance. Section III shows how the illustrative yield of a permanent plan over the nonparticipating, five-year renewable term plan can be calculated. First a method of obtaining this illustrative yield along conventional lines by accumulating funds at different interest rates is formulated. Then a method is developed whereby such a twenty-year illustrative yield can be obtained without the need to accumulate funds. Consideration is given to the illustrative yield when neither plan is yet issued and when the permanent plan is already in force with replacement by the term plan suggested. Not only is the proposed procedure much less tedious and time-consuming than the conventional method, but it is also shown to be quite accurate.

I. ILLUSTRATIVE YIELD BETWEEN LEVEL-PREMIUM PLANS

The method of calculating policyholder costs given in Paper I involves the use of an assumed interest rate. Use of a predetermined interest basis is justifiable for cost comparisons among policies under the same plan because moderate changes in the interest rate assumed have only a small effect on the difference between the costs of such policies and consequently are unlikely to affect the relative ranking of their costs. However, moderate changes in the interest rate assumed have a marked effect on the difference between the costs of policies with substantially different investment elements. It is thus desirable that the relative costs of different plans of insurance be presented in a way that is meaningful in terms of the prospective policyholder's investment expectations and income tax bracket.

A measure of the relative costs of different plans of insurance that satisfies the above requirement is the yield during the first twenty policy years on the extra funds that a policyholder places in the higher-premium plan of insurance in excess of those that he puts in the lower-premium one. When this yield is calculated on the basis of dividend illustrations, it is important that this be made clear, so that the yield will not be inter-

preted as either a guarantee or an estimate. Here such a yield is designated an "illustrative yield."

The illustrative yield of a higher-premium plan over a lower-level-premium one is calculated as the interest rate at which the net costs under the two plans are the same. Table A of the Appendix gives policyholder cost factors at interest rates of from 1 to 8 per cent at 1 per cent intervals. It is generally necessary to calculate the net costs under each plan at only two or three of these rates to determine between which two adjoining rates the illustrative yield lies. Interpolation on the difference between the plans' costs at each of these two interest rates then gives the illustrative yield rate.

If it is anticipated that the policy will be kept in force until it matures as a death claim, then the illustrative yield as calculated above is the after-tax rate. To obtain the illustrative after-tax yield appropriate to the cases in which the policy subsequently is surrendered or matures as an endowment, the costs used in determining the illustrative yield are calculated with the twentieth-year cash value reduced by the income tax (if any) payable on surrender (or maturity as an endowment) at the end of twenty years. This tax is derived by applying the prospect's marginal income tax rate to any excess of the total of the twentieth-year cash-surrender (or endowment) value and twenty years' dividends over the total of twenty years' premiums.

Implicit in any calculation of illustrative yield is an appraisal of the value of the change in net insurance protection. This value cannot be determined precisely for comparisons between two permanent plans of insurance. However, since a change in the value placed on the insurance protection of 1.00 per 1,000 corresponds to a change in illustrative yield of only about 0.1 per cent,[1] it can be seen that illustrative yields for younger issue ages are fairly accurate. At the older issue ages, illustrative yields of one permanent plan over another lower-premium one depend heavily on judgment as to the value to be placed on the insurance element and are thus less meaningful.

II. COST COMPARISONS UNDER REPLACEMENT PROPOSALS

The proposed net cost formula as stated in Part 2 of the Appendix to Paper I may be modified to give the twenty-year net cost for a policy already in force, if premiums are payable for at least twenty more years.

[1] This relationship derives from the pure endowment values of which the coefficients of the cost formula are composed, being expressible in factors of the form $(1 - q_x)(1 + i)^{-1}$.

For a policy issued at age x, the net cost from the end of the tth year is calculated as

$$(\ddot{a}_{x+t:\overline{20}|})^{-1}(\mathrm{CV}_t + \mathrm{TD}_t) + (1.0 \textit{ or } \pi^{\mathrm{AP}})(\mathrm{Premium}) - D_1^{10}\left(\sum_{t+1}^{t+10} \mathrm{Div}\right) - D_1^{20}\left(\sum_{t+1}^{t+20} \mathrm{Div}\right) - P_{x+t:\overline{20}|}^{\frac{1}{}}(\mathrm{CV}_{t+20}) - P_{x-r:\overline{20}|}^{\frac{1}{}}(\mathrm{TD}_{t+20}) , \quad (1)$$

where the factors π^{AP}, D_1^{10}, and D_1^{20} take the values tabulated for issue age $x + t$. Table B of the Appendix gives values of the initial cash-value redistribution factor $(\ddot{a}_{x:\overline{20}|})^{-1}$. It may be noted that, for policies in force, f is 1 in the factors D_f^{10} and D_f^{20}. Furthermore, the factor $P_{x-r:\overline{20}|}^{\frac{1}{}}$ (rather than $P_{x+t-r:\overline{20}|}^{\frac{1}{}}$) is applied to the terminal dividend payable at the end of the twenty years to give some recognition to the relatively greater value of the terminal dividend death benefit on policies already in force.

Application of the above formula may be illustrated with reference to a $10,000 whole life policy that Company A issued five years ago at age 40. Company B proposes to replace this with a new policy on the same plan. The cost data for Companies A and B were derived from data for those of the twenty-four large companies referred to in Section V of Paper I that do not automatically include the waiver of premium benefit in their rates. Company A's data approximately equal the averages of the data for the two companies with the highest costs on the $10,000 whole life plan at issue ages 35 and 45, while Company B's data approximately equal the averages of the data for the two companies with the lowest such costs.

In the cost calculations that follow, italicized figures refer to adjustments (or costs, as the case may be) to take account of income tax, at 25 per cent, applied on surrender of the policies at age 65.

Company A

1. Data (per $1,000 face amount):

Issue age	40
Fifth-year cash value	$ 84.00
Premium charged	$ 27.72
Total dividends sixth through fifteenth years	$ 73.80
Total dividends sixth through twenty-fifth years	$197.70
Twenty-fifth-year cash value	$500.50
Twenty-fifth-year terminal dividend	$ 16.08
Age rating to allow for terminal dividend payable on death $(r + 5)$	15 years
Premiums are apportionable and a post-mortem dividend is payable.	
Total dividends first through twenty-fifth years (for tax base)	$213.04

2. Calculation:

Income tax, at 25 per cent, payable on surrender at age 65
$= 0.25\,[213.04 + 500.50 + 16.08 - 25\,(27.72)]$
$= \$9.16.$

Cost from age 45 (1958 C.S.O. 4 per cent basis)
$= 0.07635\,(84.00) + 0.99435\,(27.72) - 0.03244\,(73.80)$
$-0.03156\,(197.70) - 0.02619\,(500.50) - 0.03055\,(16.08)$
$+0.02619\,(9.16)$
$= \$11.74$ (*or \$11.98*).

Company B

1. Data (per $1,000 face amount)

Issue age	45
Premium charged	$ 32.71
Total dividends first ten years	$ 68.25
Total dividends first twenty years	$208.56
First dividend payable at end of first year.	
Twentieth-year cash value	$458.79

No terminal dividends payable. Premiums are apportionable, and a post-mortem dividend is payable.

2. Calculation:

Income tax, at 25 per cent, payable on surrender at age 65
$= 0.25\,[208.56 + 458.79 - 20\,(32.71)]$
$= \$3.29.$

Cost (1958 C.S.O. 4 per cent basis)
$= 0.99435\,(32.71) - 0.03244\,(68.25) - 0.03156\,(208.56)$
$-0.02619\,(458.79) + 0.02619\,(3.29)$
$= \$11.71$ (*or \$11.80*).

When replacement is proposed, the policyholder should be informed not only of the relative costs over the long term but also of the loss that he would incur should he replace his old policy and then surrender the new one a short time later. This loss can be shown by a comparison of the costs of insurance per $1,000 net amount at risk in the year following the proposed replacement, using the formula prescribed by the state of Washington.[2] For Companies A and B these costs are $5.66 and $23.32, respectively.

The twenty-year illustrative yield of the old policy over the proposed replacement may be of interest to the policyholder. Twenty-year costs on the 1958 C.S.O. 3 per cent basis for Companies A and B may be shown, with no income tax charged, to be $9.36 and $9.93, respectively, and, with income tax at 25 per cent, to be $9.63 and $10.03, respectively. Consequently, the twenty-year illustrative yield of the old policy, if kept in

[2] For a description of the Washington formula see *TSA*, XX (1968), D513.

force until it matures as a death claim, is 3.95 per cent after tax or (with a 25 per cent tax rate) 5.27 per cent before tax. On the other hand, if the policy is surrendered at age 65, the twenty-year illustrative yield is (with a 25 per cent tax rate) 3.69 per cent after tax or 4.92 per cent before tax.

The illustrative yield of the old policy over the new one may be expected to be somewhat lower for periods longer than twenty years. However, little credibility can be attached to any prediction of what the actual relation between the two companies' costs will be over such an extended period. On the other hand, it is virtually certain that continuation of the present policy would be more advantageous to the policyholder should he terminate his policy within a few years. For most policyholders the possibility of termination within a period appreciably shorter than twenty years cannot be altogether ignored. If the present policyholder feels unable to rule out this possibility, he would be imprudent to entertain the proposed replacement.

In the above illustration no income tax would be payable on surrender of the old policy at the time of suggested replacement. Where such tax would be payable, it should be deducted from the initial cash value and this reduced value used in calculating twenty-year costs.

III. ILLUSTRATIVE YIELD OF A PERMANENT PLAN OVER FIVE-YEAR RENEWABLE TERM INSURANCE

The illustrative yields of most interest are those of permanent insurance over renewable term insurance or, specifically, those of whole life insurance over nonparticipating, five-year renewable term insurance. The rather tedious process conventionally used to obtain these illustrative yields is formulated first. Then a much shorter method for obtaining these illustrative yields over the first twenty policy years is demonstrated. Results under both methods are compared for various issue ages and dividend-scale patterns.

Fund Accumulation Method

To determine the illustrative yield on the extra funds placed in whole life insurance over those placed in nonparticipating renewable term insurance, it may be assumed that at the beginning of each year the renewable term insurance buyer puts into an investment fund the excess of the whole life premium, less any dividend, over the term premium required to purchase insurance for the difference between the whole life policy's death benefit and the investment fund at midyear. (In what follows "face amount" refers to the face amount under the life policy.) If the face

amount is 1,000 S, the total amount of term premium paid t years from issue is

$$f^T + S(1{,}000 + {}_ta - v^{1/2} \cdot {}_{t+1}F){}_t^1\pi^{NT}$$

where

f^T = policy fee for term insurance;
${}_ta$ = average ancillary death benefit per \$1,000 face amount in $(t+1)$th policy year (such as a mortuary dividend);
${}_tF$ = investment fund per \$1,000 face amount end of policy year t, before payment of any dividend for the year;
${}_t^1\pi^{NT}$ = term premium payable t years from issue per unit of term benefit (superscript N indicates net of policy fee); and
S = face amount in 1,000's.

The build of the fund per \$1,000 face amount is given by

$$\left\{ {}_tF - {}_tD + {}^M\pi^{GL} - \left[\frac{f^T}{S} + (1{,}000 + {}_ta - v^{1/2} \cdot {}_{t+1}F){}_t^1\pi^{NT} \right] \right\} \times (1+i) = {}_{t+1}F ,$$

where ${}_tD$ is the whole life dividend per \$1,000 face amount for tth policy year and ${}^M\pi^{GL}$ is the whole life premium charged per \$1,000 face amount (including appropriate fraction of the relevant policy fee).

It follows that

$${}_{+1}F = \frac{({}_tF - {}_tD + {}^M\pi^{GL} - {}_t^M\pi^{GT} - {}_ta \cdot {}_t^1\pi^{NT})}{1 - (1+i)^{1/2} \cdot {}_t^1\pi^{NT}} (1+i) , \qquad (2)$$

where ${}_t^M\pi^{GT}$ is the term premium charged t years from issue per 1,000 of term benefit, including fraction of policy fee appropriate for a term benefit of 1,000 S. (Thus ${}_t^M\pi^{GT} = f^T/S + 1{,}000 \cdot {}_t^1\pi^{NT}$.)

To obtain the illustrative yield over the n years following the end of the mth policy year, the fund at the start of the period, ${}_mD + \mathrm{CV}_m + \mathrm{TD}_m$, is accumulated through n years at different interest rates by application of formula (2). The rate that gives ${}_{m+n}F - {}_{m+n}D = \mathrm{CV}_{m+n} + \mathrm{TD}_{m+n}$ is then found by interpolation. When neither plan is yet issued m, ${}_mF$, and ${}_mD$ are zero, and, when replacement of permanent insurance by term insurance is contemplated, m is the duration at which replacement would occur.

Proposed Method—Neither Plan Yet Issued

In lieu of the above accumulation method, the twenty-year illustrative yield of a whole life plan over a nonparticipating, five-year renewable term plan can be found by using the same approach outlined earlier for

obtaining the illustrative yield of a higher-premium plan over a lower-premium one. The calculation falls into three parts:

a) Determination of an appropriate rated age on the 1958 C.S.O. table to correspond to the value of mortality as reflected in the five-year renewable term premiums.

b) Determination, using factors for the nearest integral-rated age, of the illustrative yield of the whole life plan over the five-year renewable term plan, with the level twenty-year cost for the term insurance obtained by applying the redistribution factors given in Table C of the Appendix to the five-year renewable term premiums.

c) Adjustment of the yield from *b* to give the yield for the exact rated age.

The term $[(1 + i)^{1/2} \cdot {}_t\pi^{NT}]$ in the denominator of formula (2) can be regarded as having the role of a mortality rate. We thus have to determine which series of rates from a mortality table would be equivalent in its effect to the series of values of $[(1 + i)^{1/2} \cdot {}_t\pi^{NT}]$. The relative effect of these values on the growth of the fund depends on the size of the numerator of formula (2). This is roughly proportional to ${}_{t+1}F$ or, as a convenient approximation for the present purpose, to $t + 1$. On this account, then, for any given issue age the four five-year term premiums payable during the first twenty policy years should be weighted, in order, 3, 8, 13, and 18. Allowing also for the effect of interest, a weighted average rate per 1,000 is obtained of

$$\sum_{r=0}^{3} K_r \cdot {}^{M}_{5r}\pi^{N5T}, \tag{3}$$

where

$$K_r = \frac{(5r + 3)v^{5r-0.5}}{\sum_{r=0}^{3}(5r + 3)v^{5r}}$$

and ${}^{M}_{t}\pi^{N5T}$ is the five-year renewable term premium per 1,000, net of policy fee, payable from policy duration t.

The corresponding average rate from a mortality table is obtained by applying weights similar to K_r to net five-year term premiums derived from the table. However, as mortality table rates change from year to year and the numerator of formula (2) increases from year to year, these term premiums should reflect the additional weight attached to succeeding mortality rates within each five-year period. Thus, in accordance with the approximation made above, the successive mortality rates should be weighted 1, 2, 3, . . . 20. To reflect these weights, the net five-year term premiums should be for an increasing death benefit that equals t in the tth policy year from the beginning of the twenty-year period. Correspond-

ing, then, to the weighted rate of formula (3), the weighted average mortality rate may be taken to be 1,000 Q_x, where

$$Q_x = \frac{\sum_{r=0}^{3} v^{5r-1}\left[\dfrac{5r(M_{x+5r} - M_{x+5r+5}) + R_{x+5r} - R_{x+5r+5} - 5M_{x+5r+5}}{N_{x+5r} - N_{x+5r+5}}\right]}{\sum_{r=0}^{3}(5r+3)v^{5r}}. \quad (4)$$

If the rate obtained by application of formula (3) is closest to that for age x given by formula (4), an illustrative yield i_x would be calculated, using the factors for age x from Tables A and C of the Appendix. If, further, the rate obtained by application of formula (3) equals $Q_x + h$, the required illustrative yield i'' calculated using this value is given by

$$\frac{1 - (Q_x + h)}{1 + i''} = \frac{1 - Q_x}{1 + i_x},$$

since, with i'' so defined, pure endowments (and hence policy cost redistribution factors) based on mortality and interest rates $Q_x + h$ and i'' have the same values as those based on mortality and interest rates Q_x and i_x. It follows that

$$i'' = i_x - \left(\frac{1 + i_x}{1 - Q_x}\right) h.$$

Since h is small, it may be assumed that

$$i'' = i_x - (1 + i)h,$$

where i is the rate of interest used in applying formulas (3) and (4).

The calculation of i'' is made easier if loaded values K'_r and Q'_x, such that $K'_r = (1 + i)K_r$ and $Q'_x = (1 + i)Q_x$, are used instead of K_r and Q_x. The former value $Q_x + h$ then becomes $Q'_x + h'$, where $h' = (1 + i)h$, so that $i'' = i_x - h'$. Values of K'_r and Q'_x are given in Table D of the Appendix. (Here $\lambda = 0$.)

The following example of a calculation of illustrative yield of whole life insurance over five-year renewable term insurance uses average data for twenty mutual and ten stock companies for policy amount $10,000 at issue age 35. It ignores ancillary death benefits.

In the following calculations of costs and yields italicized figures refer to adjustments (or costs or yields, as the case may be) needed to take account of income tax, at 25 per cent, applied on surrender of the whole life policy at the end of twenty years.

It should be noted that the interest rates quoted are all after-tax earned interest rates. Thus, for the 25 per cent tax bracket, which has been used

for tax on gains, $1\frac{1}{3}$ times the interest rates suggested would have to be earned on the money invested in a taxable fund.

Data

Whole life plan:

Premium charged per $1,000	$ 23.41
Total dividends first ten years	$ 39.43
Total dividends first twenty years	$132.37
Twentieth-year cash-surrender value	$373.34

First dividend assumed payable at end of first policy year.

Five-year renewable term plan (nonparticipating):

Premiums per $1,000 net policy fee $5.17, $6.63, $9.14, $13.41.

Premiums charged per $1,000 for $10,000 benefit $6.28, $7.63, $10.14, $14.41.

Calculation[3]

Income tax, at 25 per cent, payable on surrender of whole life policy at the end of twenty years

$$=0.25\,[132.37 + 373.34 - 20\,(23.41)]$$
$$=\$9.38.$$

Loaded average mortality rate $(D) = 0.12459\,(5.17) + 0.26032\,(6.63) + 0.33144\,(9.14) + 0.35958\,(13.41) = 10.22.$

Nearest integral-rated age $(D) = 39$.

Policyholder costs at 5 per cent, using age 39 factors:

Whole life (A): $23.41 - 0.03482\,(39.43) - 0.02987\,(132.37) - 0.02545\,(373.34 - 9.38) = 8.58$ (*or 8.82*).

5 Y.R.T. (C): $0.36039\,(6.28) + 0.27600\,(7.63) + 0.20878\,(10.14) + 0.15483\,(14.41) = 8.72.$

Difference in cost $= -0.14$ (*or 0.10*).

Policyholder costs at 6 per cent, using age 39 factors:

Whole life (A): $23.41 - 0.03993\,(39.43) - 0.02688\,(132.37) - 0.02261\,(373.34 - 9.38) = 9.84$ (*or 10.05*).

5 Y.R.T. (C): $0.38020\,(6.28) + 0.27771\,(7.63) + 0.20036\,(10.14) + 0.14172\,(14.41) = 8.58.$

Difference in cost $= 1.26$ (*or 1.47*).

Yield using age 39 factors $= [5.00 + 0.14/(1.26 + 0.14)]\%$ *or* $[5.00 - 0.10/(1.47 - 0.10)]\%$
$=5.10\%$ (*or 4.93%*).

[3] Letters in parentheses refer to the appendixed tables used.

Required yield (D) = Yield using age 39 factors $-$ 0.1 (10.22 $-$ 9.91)%
= 5.10% (*or 4.93%*) $-$ 0.03%
= 5.07% (*or 4.90%*).

As a check the yield using age 40 factors is calculated to be 5.01% (*or 4.84%*) and:

Required yield (D) = yield using age 40 factors $-$ 0.1 (10.22–10.82)%
= 5.01% (*or 4.84%*) + 0.06%
= 5.07% (*or 4.90%*).

To test the accuracy of this result, the illustrative yield may be found by conventional means, accumulating funds at different interest rates,

TABLE 1

20-YEAR ILLUSTRATIVE YIELD ERRORS (PARTICIPATING WHOLE LIFE INSURANCE VS. NONPARTICIPATING, FIVE-YEAR RENEWABLE TERM INSURANCE)

Issue Age	Approximate Illustrative Yield* (Per Cent)	Error in Approximate Illustrative Yield as Shown by Fund Accumulations		
		If Dividends in Arithmetical Progression (Per Cent)	If Dividends in Geometrical Progression (Per Cent)	If Dividends Increase Twice as Rapidly at Central Durations† (Per Cent)
25.....	5.32	0.00	0.00	−0.02
35.....	5.07	.00	− .01	− .03
45.....	5.31	− .01	− .01	− .04
50.....	5.62	−0.02	−0.04	−0.07

NOTE.—The first dividend is assumed payable at the end of the first policy year for issue ages 35 and 50 and at the end of the second policy year for issue ages 25 and 45.

* The illustrative yields are based on average data for a number of companies.

† Successive dividends to policy year 8 and from policy year 13 differ by a constant amount. Successive dividends between policy years 8 and 13 differ by twice this amount.

using formula (2). It is necessary to stipulate a specific scale of dividends with, of course, ten-year and twenty-year totals as given. If the dividends are in arithmetical progression, $({}_{20}F - {}_{20}D)$ is found at interest rates 5.065 and 5.075 per cent to have the values $372.97 and $373.55, respectively. Since the twentieth-year cash-surrender value is $373.34, the illustrative yield of 5.07 per cent obtained above is, with dividends in arithmetical progression, correct to the nearest 0.01 per cent.

If the dividends form a geometrical progression, the approximate illustrative yield of 5.07 per cent is found to be −0.01 per cent in error.

Table 1 shows, for issue ages 25, 35, 45, and 50, approximate twenty-year illustrative yields of participating whole life insurance over nonparticipating, five-year renewable term insurance and the errors in these

yields for dividend scales in arithmetical progression, in geometrical progression, and in a third form that is designed so that the present values of both the first ten years' and the second ten years' dividends are larger than they are on the scale in arithmetical progression. For most dividend scales (as in the case of any scale with monotonic first differences) the present values of the dividends payable in the first ten and the second ten policy years are such that, while one of these values exceeds the value of the corresponding dividends on the dummy scale in arithmetical progression, the other value falls short of the value of the corresponding dividends in arithmetical progression. Thus the errors for the third scale shown in Table 1 are larger than those generally encountered.

This is confirmed by a consideration of the frequency of equivalent-level dividend errors and the effect of changes in policyholder costs on illustrative yields. For example, the greatest equivalent-level dividend error shown in Table 1 of Paper I for issue age 35 on the whole life plan is \$0.05. The calculation above shows that such a change in policyholder cost would change the illustrative yield by (0.05/1.40) per cent, or 0.036 per cent.

The illustrative yields and associated errors shown in Table 1 take no account of ancillary death benefits. Approximate illustrative yields have been calculated for issue age 50, using the data on which Table 1 is based but with allowance for the apportionable premium benefit and the post-mortem dividend benefit in the whole life costs. These results may be compared with those obtained from fund accumulations using formula (2).

Allowance for the apportionable premium benefit in the whole life costs increases the approximate illustrative yield over the five-year renewable term insurance by 0.23 per cent at issue age 50. Allowance at this issue age for the post-mortem dividend benefit increases the approximate illustrative yield by 0.07 per cent. Fund accumulations using formula (2) show that these increases are correct to the nearest 0.01 per cent.

Nonparticipating, five-year renewable term insurance does not usually carry the apportionable premium benefit. When this is included and the whole life insurance also carries the benefit, tests for various issue ages show that approximate allowance for the benefit may be made by rating down the factor π^{AP} of Table A of the Appendix by six years before applying it to the whole life premium. When the benefit is included in the term insurance but not in the whole life insurance, the reduction in π^{AP} resulting from a six-year rate-down in age may be added to 1.0 to obtain the factor applicable to the whole life premium.

The effect of a change in dividend scale on yield may be readily determined. For example, in the case illustrated above, a reduction of \$10.00 in

the amount of dividends payable in the second ten policy years would increase the whole life cost by $10(D_1^{20})$, or \$0.30. (See factor for 1958 C.S.O. 5 per cent, age 39.) The corresponding reduction in yield of approximately (0.30/1.40) per cent, or 0.21 per cent, should be applied to the illustrative yield of 5.07 per cent to give the after-tax yield applicable when the policy is continued in force until it matures as a death claim. If the policy were to be subsequently surrendered, the after-tax yield of 4.90 per cent should, with income tax at 25 per cent, be reduced by 75 per cent of 0.21 per cent, or 0.16 per cent.

An alternative way to relate changes in yields and dividend scales is to determine the change in dividend scale needed to produce a given yield. For example, in the case illustrated above, the reduction in the amount of dividends payable in the second ten policy years needed to lower the yield to 4 per cent may be determined. Policyholder costs on the 1958 C.S.O. 4 per cent basis for age 39 are calculated to be \$7.21 for the life plan and \$8.86 for the term plan. The difference of (−\$1.65) between these costs is noted to be \$1.51 below the difference of (−\$0.14) between the costs on the 1958 C.S.O. 5 per cent basis for age 39, as shown in the illustrative calculation above. The reduction in the amount of dividends payable in the second ten policy years that would produce a lowering of the yield rate from 5.07 to 4 per cent is thus about 1.07 $(1.51/D_1^{20})$, or \$48.95. (See factor for 1958 C.S.O. 4 per cent, age 39.) With this drastic change in the dividend scale, no income tax would be payable on surrender at the end of twenty years, so that 4 per cent would be the after-tax rate in this eventuality as well as when the policy matures as a death claim.

It may be noted that changes in the dividend totals of the first and second ten policy years may readily be related to changes in the excess interest or other factors on which the dividend scale is based.

A prospective policyholder interested in comparing the costs of whole life and five-year renewable term policies should not only be informed of yields over twenty years but should also be made aware of his extra net outlay were he to buy the life policy and then surrender it when a cash value first becomes available.

Illustrative yields are sometimes calculated on the basis of assumed rates of termination. It is to be doubted whether the prospective policyholder can make a meaningful choice from among arrays of such rates. However, given the twenty-year illustrative after-tax and before-tax yields applicable to his circumstances (preferably with some indication of how changes in the dividend scale would affect these yields), his extra net outlay on surrender of the life policy a year or two after issue, and an understanding that this potential loss may be expected to be gradually

written off with illustrative yields approaching the twenty-year illustrative yield emerging toward the end of the twenty-year period—given this intelligence, the prospect is better able to appraise the relative cost of the plans, since the differences between them are expressed in financial terms that he can readily comprehend. In making this appraisal the prospect would (perhaps subconsciously) weigh the likelihood of his withdrawing, but he would not have to go through the baffling experience of trying to translate this likelihood into a set of numerical probabilities.

It may be noted that approximate illustrative yields over five-year renewable term insurance are but little affected by the interest rate assumed in computing values of K'_r and Q'_x. For example, if these values are based on a 6 per cent rather than a 5 per cent rate, then the approximate illustrative yields of Table 1 are reduced at issue ages 25 and 35 by 0.01 per cent and at issue ages 45 and 55 by 0.02 per cent.

Proposed Method—Permanent Plan Already in Force

The method described above for closely approximating the twenty-year illustrative yield of a (not yet issued) whole life plan over a nonparticipating, five-year renewable term plan can be adapted to enable the twenty-year illustrative yield to be rapidly determined when the life policy is already in force and the term insurance is proposed as a replacement. Costs under the life plan are calculated, using formula (1) in Section II above. Formulas (3) and (4), which give the values of K_r and Q_x, are adjusted so that, in effect, the fund given by formula (2) is assumed to increase linearly through the twenty years from the cash-surrender value at the start to that at the end. On this assumption, if the ratio of the former value to the latter is λ, the fund at the end of the tth year of the twenty-year period is proportional to $[t + 20\lambda/(1 - \lambda)]$. Consequently $20\lambda/(1 - \lambda)$ must be added to (*a*) the coefficients $(5r + 3)$ in the numerator and denominator of formula (3) and in the denominator of formula (4) and (*b*) the coefficient $5r$ in the numerator of formula (4).

Values of K'_r and Q'_x based on values of K_r and Q_x with the above modification are included in Table D of the Appendix for $\lambda = 0.1$, 0.2, 0.3, 0.4, and 0.5.

Application of this method will be illustrated with reference to a proposal that the life policy issued five years ago by Company A (for which data are given in Sec. II) be replaced with nonparticipating, five-year renewable term insurance issued by Company C. Each of this company's four relevant term premiums equals the average of the two lowest pre-

miums charged at the same age by ten large stock companies. These premiums are per $1,000:

Net of the policy fee..... $3.53, $12.15, $17.86, $27.96
Charged for $10,000 benefit..... $9.53, $13.15, $18.86, $28.96

The value of λ here is (84.00/515.58), or 0.163; using the relevant values of K'_r from Table D of the Appendix, the loaded average mortality rate is found to be 0.21359 (8.53) + 0.27194 (12.15) + 0.29503 (17.86) +0.29537 (27.96) = 18.65. A comparison of this value with the relevant values of Q'_x given in Table D shows that the nearest integral-rated age is 47 and that the required illustrative yield is 0.02 per cent below the yield obtained using factors for this age. The requisite cost calculations may be

TABLE 2

POLICYHOLDER COSTS

(With 1958 C.S.O. Age 47 Factors)

	5 Per Cent	6 Per Cent
Whole life.....	14.57 (*or 14.78*)	16.60 (*or 16.79*)
5 Y.R.T.....	15.22	14.90
Difference in costs...	− 0.65 (*or −0.44*)	1.70 (*or 1.89*)

Illustrative yield = [5.28 (*or 5.19*) − 0.02] per cent
= 5.26 (*or 5.17*) per cent

laid out in Table 2. (Italicized costs and yields take account of income tax, at 25 per cent, applied on surrender of the life policy at age 65.)

The illustrative yield for the case in Table 2, obtained by accumulating funds using formula (2) and taking account of Company A's apportionable premium benefit, post-mortem dividends, and terminal dividend death benefit, is 5.251 (*or 5.168*) per cent.[4]

It may be noted that without the various auxiliary death benefits of Company A the illustrative yield is 5.12 (*or 5.03*) per cent by the approximate method and 5.111 (*or 5.027*) per cent using formula (2).

One source of error in approximate illustrative yields is the equivalent-level dividend error, which here is $0.033. Elimination of this error would reduce the above approximate illustrative yields about 0.014 per cent.

[4] Company A's relevant annual dividends are, in order, $4.42, $4.92, $5.66, $6.40, $7.17, $7.99, $8.62, $9.09, $9.54, $9.99, $10.43, $10.86, $11.26, $11.70, $12.15, $12.60, $13.04, $13.50, $13.95, and $14.41. The terminal dividends payable on death in the last fourteen of the twenty years are, in order, $0.50, $1.22, $1.95, $2.67, $3.39, $5.30, $7.19, $9.10, $11.00, $12.90, $13.54, $14.17, $14.81, and $15.44.

APPENDIX

TABLE A

POLICYHOLDER COST FACTORS

1958 C.S.O. 1 PER CENT

ISSUE AGE x	π^{AP}*	NO POST-MORTEM DIVIDEND				WITH POST-MORTEM DIVIDEND				$10^5 \times P_{x:\overline{10}\rceil}^{\frac{1}{}}$
		D_1^{10}*	D_1^{20}*	D_2^{10}*	D_2^{20}*	D_1^{10}*	D_1^{20}*	D_2^{10}*	D_2^{20}*	
5.....	99,930	751	4,567	713	4,577	751	4,572	712	4,581	4,418
15.....	99,910	781	4,550	741	4,560	780	4,556	740	4,565	4,397
20.....	99,896	798	4,541	757	4,550	796	4,547	755	4,557	4,379
21.....	99,893	802	4,538	761	4,548	801	4,544	760	4,554	4,373
22.....	99,888	808	4,535	767	4,544	806	4,541	765	4,551	4,366
23.....	99,883	815	4,531	774	4,540	813	4,538	771	4,548	4,359
24.....	99,877	823	4,526	782	4,536	820	4,534	779	4,544	4,350
25.....	99,871	832	4,521	791	4,531	828	4,529	787	4,539	4,340
26.....	99,863	842	4,515	801	4,525	838	4,524	797	4,534	4,329
27.....	99,854	854	4,508	813	4,518	850	4,518	809	4,528	4,316
28.....	99,845	868	4,500	827	4,510	863	4,511	822	4,521	4,302
29.....	99,834	884	4,491	843	4,501	877	4,503	836	4,513	4,286
30.....	99,822	901	4,481	860	4,491	894	4,494	853	4,504	4,269
31.....	99,808	921	4,470	880	4,480	913	4,484	871	4,494	4,249
32.....	99,793	943	4,457	901	4,467	934	4,473	892	4,482	4,228
33.....	99,776	967	4,443	926	4,453	957	4,460	916	4,470	4,204
34.....	99,757	995	4,427	952	4,437	983	4,446	941	4,456	4,179
35.....	99,736	1,025	4,410	982	4,420	1,012	4,430	970	4,440	4,150
36.....	99,713	1,058	4,391	1,014	4,402	1,044	4,413	1,001	4,423	4,120
37.....	99,688	1,094	4,370	1,050	4,381	1,079	4,394	1,035	4,405	4,086
38.....	99,660	1,134	4,348	1,089	4,358	1,118	4,374	1,073	4,384	4,050
39.....	99,630	1,177	4,323	1,131	4,334	1,160	4,351	1,114	4,362	4,010
40.....	99,596	1,225	4,295	1,178	4,307	1,206	4,326	1,159	4,337	3,967
41.....	99,560	1,277	4,266	1,228	4,277	1,256	4,299	1,208	4,311	3,920
42.....	99,521	1,333	4,233	1,284	4,245	1,311	4,270	1,262	4,281	3,869
43.....	99,477	1,395	4,198	1,344	4,210	1,371	4,237	1,320	4,249	3,814
44.....	99,431	1,463	4,159	1,410	4,172	1,437	4,202	1,384	4,214	3,754
45.....	99,380	1,536	4,117	1,481	4,130	1,508	4,164	1,454	4,176	3,690
46.....	99,324	1,616	4,071	1,559	4,085	1,586	4,122	1,530	4,135	3,621
47.....	99,264	1,703	4,021	1,643	4,036	1,671	4,076	1,612	4,090	3,546
48.....	99,199	1,797	3,967	1,734	3,982	1,763	4,026	1,702	4,041	3,466
49.....	99,127	1,900	3,908	1,834	3,924	1,864	3,972	1,799	3,988	3,379
50.....	99,050	2,011	3,845	1,941	3,861	1,974	3,914	1,905	3,930	3,286
51.....	98,967	2,132	3,775	2,058	3,793	2,092	3,850	2,020	3,867	3,187
52.....	98,878	2,263	3,700	2,184	3,719	2,222	3,780	2,145	3,799	3,083
53.....	98,782	2,404	3,620	2,320	3,640	2,361	3,706	2,279	3,725	2,973
54.....	98,681	2,556	3,533	2,466	3,555	2,512	3,625	2,424	3,646	2,859
55.....	98,573	2,718	3,441	2,621	3,464	2,674	3,538	2,579	3,561	2,742
56.....	98,458	2,890	3,342	2,785	3,367	2,847	3,446	2,744	3,470	2,621
57.....	98,335	3,074	3,238	2,959	3,265	3,031	3,347	2,920	3,373	2,495
58.....	98,205	3,268	3,127	3,143	3,156	3,228	3,242	3,106	3,271	2,365
59.....	98,067	3,474	3,009	3,337	3,042	3,436	3,130	3,303	3,162	2,231
60.....	97,919	3,692	2,885	3,541	2,920	3,658	3,012	3,511	3,046	2,091

NOTE.—π^{AP}: factor applicable to premium when a premium refund is payable on death. D_f^s: factor applicable to the sum of the first s policy years' dividends, when the first dividend is payable for policy year f.

* These values are 10^5 times the values as defined above.

TABLE A—*Continued*

1958 C.S.O. 2 PER CENT

Issue Age x	$\pi^{AP}*$	No Post-Mortem Dividend				With Post-Mortem Dividend				$10^5 \times P_{x:\overline{20}\rceil}^{\frac{1}{}}$
		$D_1^{10}*$	$D_1^{20}*$	$D_2^{10}*$	$D_2^{20}*$	$D_1^{10}*$	$D_1^{20}*$	$D_2^{10}*$	$D_2^{20}*$	
5.....	99,931	1,381	4,204	1,302	4,223	1,381	4,208	1,302	4,226	3,962
15.....	99,911	1,410	4,187	1,330	4,207	1,410	4,192	1,330	4,211	3,943
20.....	99,898	1,426	4,178	1,345	4,197	1,426	4,184	1,344	4,203	3,927
21.....	99,894	1,431	4,175	1,349	4,195	1,430	4,181	1,348	4,201	3,921
22.....	99,890	1,436	4,172	1,355	4,192	1,435	4,178	1,354	4,198	3,915
23.....	99,885	1,443	4,168	1,361	4,188	1,441	4,175	1,359	4,195	3,908
24.....	99,879	1,450	4,164	1,369	4,183	1,448	4,171	1,366	4,191	3,900
25.....	99,873	1,459	4,159	1,377	4,178	1,457	4,167	1,375	4,186	3,891
26.....	99,866	1,469	4,153	1,387	4,173	1,466	4,162	1,384	4,181	3,881
27.....	99,858	1,481	4,147	1,399	4,166	1,477	4,156	1,395	4,175	3,869
28.....	99,849	1,494	4,139	1,412	4,159	1,489	4,149	1,407	4,169	3,856
29.....	99,838	1,509	4,131	1,426	4,150	1,504	4,142	1,421	4,161	3,842
30.....	99,826	1,525	4,121	1,443	4,141	1,520	4,133	1,437	4,153	3,826
31.....	99,813	1,544	4,110	1,462	4,130	1,538	4,123	1,455	4,143	3,808
32.....	99,799	1,566	4,098	1,482	4,118	1,558	4,112	1,475	4,132	3,789
33.....	99,782	1,589	4,085	1,506	4,104	1,581	4,100	1,497	4,120	3,767
34.....	99,764	1,615	4,070	1,531	4,090	1,606	4,087	1,522	4,107	3,744
35.....	99,744	1,644	4,053	1,559	4,073	1,634	4,072	1,549	4,092	3,718
36.....	99,722	1,676	4,035	1,590	4,055	1,665	4,055	1,579	4,075	3,690
37.....	99,697	1,711	4,015	1,624	4,035	1,698	4,037	1,612	4,057	3,659
38.....	99,670	1,749	3,993	1,661	4,014	1,735	4,017	1,648	4,038	3,626
39.....	99,641	1,791	3,969	1,702	3,990	1,776	3,995	1,687	4,016	3,590
40.....	99,609	1,836	3,943	1,746	3,964	1,820	3,971	1,730	3,993	3,550
41.....	99,574	1,886	3,914	1,794	3,936	1,869	3,945	1,777	3,967	3,507
42.....	99,535	1,941	3,883	1,847	3,905	1,922	3,917	1,829	3,939	3,461
43.....	99,494	2,000	3,849	1,904	3,871	1,980	3,885	1,885	3,908	3,411
44.....	99,448	2,065	3,812	1,967	3,835	2,043	3,851	1,946	3,874	3,357
45.....	99,399	2,135	3,771	2,035	3,795	2,112	3,814	2,012	3,838	3,298
46.....	99,345	2,212	3,727	2,108	3,752	2,187	3,774	2,085	3,798	3,235
47.....	99,287	2,295	3,680	2,189	3,705	2,269	3,730	2,164	3,755	3,167
48.....	99,223	2,386	3,628	2,276	3,654	2,358	3,682	2,249	3,708	3,094
49.....	99,154	2,484	3,571	2,370	3,598	2,455	3,630	2,342	3,657	3,015
50.....	99,080	2,591	3,510	2,472	3,538	2,560	3,574	2,443	3,601	2,931
51.....	98,999	2,706	3,444	2,583	3,473	2,674	3,512	2,552	3,541	2,841
52.....	98,913	2,831	3,372	2,702	3,403	2,798	3,446	2,671	3,476	2,746
53.....	98,820	2,966	3,295	2,831	3,327	2,933	3,374	2,799	3,405	2,646
54.....	98,721	3,111	3,212	2,969	3,246	3,077	3,296	2,936	3,330	2,543
55.....	98,616	3,266	3,124	3,115	3,159	3,232	3,213	3,084	3,248	2,437
56.....	98,504	3,431	3,029	3,271	3,067	3,398	3,124	3,241	3,162	2,327
57.....	98,385	3,606	2,929	3,435	2,970	3,575	3,030	3,407	3,069	2,213
58.....	98,258	3,791	2,823	3,609	2,867	3,763	2,929	3,584	2,971	2,096
59.....	98,122	3,987	2,711	3,791	2,758	3,963	2,822	3,770	2,868	1,975
60.....	97,978	4,194	2,593	3,983	2,643	4,174	2,709	3,967	2,758	1,849

TABLE A—*Continued*

1958 C.S.O. 3 PER CENT

Issue Age x	π^{AP}*	No Post-Mortem Dividend				With Post-Mortem Dividend				$10^5 \times P_{x:\overline{20}\rceil}^{1}$
		D_1^{10}*	D_1^{20}*	D_2^{10}*	D_2^{20}*	D_1^{10}*	D_1^{20}*	D_2^{10}*	D_2^{20}*	
5.....	99,932	1,988	3,853	1,864	3,883	1,988	3,857	1,864	3,886	3,547
15.....	99,912	2,016	3,837	1,890	3,867	2,017	3,841	1,890	3,871	3,529
20.....	99,899	2,032	3,828	1,904	3,858	2,032	3,833	1,904	3,863	3,514
21.....	99,895	2,036	3,826	1,909	3,856	2,036	3,831	1,908	3,861	3,509
22.....	99,891	2,041	3,823	1,914	3,853	2,041	3,828	1,913	3,859	3,503
23.....	99,887	2,047	3,819	1,920	3,849	2,046	3,825	1,919	3,855	3,497
24.....	99,882	2,054	3,815	1,927	3,845	2,053	3,822	1,925	3,852	3,490
25.....	99,876	2,063	3,810	1,935	3,840	2,061	3,817	1,933	3,848	3,481
26.....	99,869	2,072	3,805	1,944	3,835	2,070	3,812	1,942	3,843	3,472
27.....	99,861	2,083	3,798	1,955	3,829	2,081	3,807	1,952	3,837	3,462
28.....	99,852	2,096	3,791	1,967	3,821	2,093	3,800	1,964	3,831	3,450
29.....	99,842	2,110	3,783	1,981	3,813	2,106	3,793	1,978	3,824	3,437
30.....	99,831	2,126	3,774	1,997	3,804	2,121	3,785	1,993	3,815	3,422
31.....	99,818	2,144	3,763	2,015	3,794	2,139	3,775	2,010	3,806	3,406
32.....	99,804	2,164	3,752	2,035	3,783	2,158	3,765	2,029	3,796	3,388
33.....	99,789	2,187	3,739	2,057	3,770	2,180	3,753	2,050	3,784	3,369
34.....	99,771	2,212	3,725	2,081	3,756	2,204	3,740	2,074	3,771	3,347
35.....	99,752	2,240	3,709	2,108	3,740	2,231	3,726	2,100	3,757	3,324
36.....	99,730	2,270	3,691	2,137	3,723	2,261	3,710	2,128	3,741	3,298
37.....	99,707	2,303	3,672	2,169	3,704	2,293	3,692	2,159	3,724	3,270
38.....	99,681	2,340	3,651	2,205	3,683	2,329	3,673	2,194	3,705	3,240
39.....	99,652	2,380	3,628	2,243	3,661	2,368	3,652	2,231	3,685	3,207
40.....	99,621	2,424	3,603	2,285	3,636	2,411	3,629	2,272	3,662	3,171
41.....	99,587	2,471	3,576	2,331	3,609	2,457	3,604	2,317	3,637	3,132
42.....	99,550	2,524	3,546	2,381	3,579	2,509	3,577	2,366	3,610	3,090
43.....	99,509	2,580	3,513	2,435	3,547	2,564	3,547	2,420	3,581	3,044
44.....	99,465	2,642	3,477	2,495	3,512	2,625	3,514	2,478	3,549	2,995
45.....	99,417	2,710	3,439	2,559	3,474	2,691	3,478	2,541	3,514	2,942
46.....	99,365	2,783	3,397	2,629	3,433	2,764	3,440	2,610	3,476	2,884
47.....	99,309	2,863	3,351	2,705	3,388	2,842	3,397	2,685	3,434	2,823
48.....	99,247	2,949	3,301	2,787	3,340	2,927	3,351	2,766	3,390	2,756
49.....	99,181	3,043	3,247	2,876	3,287	3,020	3,302	2,855	3,341	2,685
50.....	99,108	3,145	3,189	2,973	3,230	3,121	3,247	2,950	3,288	2,608
51.....	99,030	3,255	3,126	3,078	3,168	3,231	3,188	3,054	3,230	2,527
52.....	98,946	3,374	3,057	3,190	3,101	3,349	3,125	3,167	3,168	2,441
53.....	98,856	3,503	2,984	3,312	3,029	3,478	3,056	3,288	3,101	2,351
54.....	98,760	3,641	2,905	3,442	2,952	3,616	2,982	3,418	3,028	2,258
55.....	98,657	3,788	2,820	3,580	2,870	3,764	2,902	3,558	2,951	2,161
56.....	98,548	3,945	2,730	3,726	2,782	3,923	2,817	3,706	2,869	2,062
57.....	98,432	4,112	2,635	3,881	2,690	4,092	2,727	3,864	2,781	1,960
58.....	98,308	4,288	2,534	4,044	2,592	4,271	2,630	4,030	2,688	1,855
59.....	98,176	4,474	2,427	4,215	2,488	4,462	2,528	4,206	2,589	1,746
60.....	98,035	4,670	2,314	4,395	2,379	4,663	2,420	4,391	2,485	1,633

NOTE.—π^{AP}: factor applicable to premium when a premium refund is payable on death. D_f^s: factor applicable to the sum of the first s policy years' dividends, when the first dividend is payable for policy year f.

* These values are 10^5 times the values as defined above.

TABLE A—*Continued*

1958 C.S.O. 4 PER CENT

Issue Age x	$\pi^{AP}*$	No Post-Mortem Dividend				With Post-Mortem Dividend				$10^5 \times P_{x:\overline{30}|}^{\frac{1}{}}$
		$D_1^{10}*$	$D_1^{20}*$	$D_2^{10}*$	$D_2^{20}*$	$D_1^{10}*$	$D_1^{20}*$	$D_2^{10}*$	$D_2^{20}*$	
5.....	99,933	2,570	3,516	2,396	3,557	2,570	3,519	2,396	3,560	3,168
15.....	99,913	2,597	3,500	2,421	3,542	2,598	3,504	2,422	3,546	3,152
20.....	99,900	2,612	3,491	2,434	3,534	2,613	3,496	2,435	3,538	3,138
21.....	99,897	2,616	3,489	2,438	3,531	2,617	3,494	2,439	3,536	3,134
22.....	99,893	2,621	3,486	2,443	3,528	2,621	3,492	2,443	3,534	3,129
23.....	99,889	2,627	3,483	2,449	3,525	2,627	3,489	2,449	3,531	3,123
24.....	99,884	2,633	3,479	2,455	3,521	2,633	3,485	2,455	3,527	3,116
25.....	99,878	2,641	3,474	2,463	3,517	2,641	3,481	2,462	3,523	3,109
26.....	99,871	2,650	3,469	2,472	3,511	2,649	3,476	2,471	3,519	3,100
27.....	99,864	2,661	3,463	2,482	3,506	2,659	3,471	2,480	3,513	3,091
28.....	99,855	2,673	3,456	2,494	3,499	2,671	3,465	2,492	3,507	3,080
29.....	99,846	2,686	3,449	2,507	3,491	2,684	3,458	2,504	3,500	3,068
30.....	99,835	2,701	3,440	2,522	3,482	2,698	3,450	2,519	3,493	3,055
31.....	99,823	2,719	3,430	2,539	3,473	2,715	3,441	2,535	3,484	3,041
32.....	99,810	2,738	3,419	2,557	3,462	2,734	3,431	2,553	3,474	3,024
33.....	99,795	2,760	3,407	2,578	3,450	2,754	3,420	2,573	3,463	3,007
34.....	99,778	2,783	3,393	2,601	3,436	2,778	3,407	2,595	3,450	2,987
35.....	99,759	2,810	3,378	2,627	3,421	2,803	3,394	2,620	3,437	2,966
36.....	99,738	2,839	3,361	2,654	3,405	2,832	3,378	2,647	3,422	2,942
37.....	99,715	2,871	3,343	2,685	3,387	2,863	3,361	2,677	3,405	2,917
38.....	99,690	2,906	3,323	2,718	3,367	2,897	3,343	2,710	3,387	2,889
39.....	99,663	2,944	3,301	2,755	3,346	2,935	3,323	2,746	3,368	2,859
40.....	99,632	2,986	3,277	2,794	3,322	2,976	3,301	2,785	3,346	2,827
41.....	99,599	3,031	3,251	2,838	3,296	3,020	3,277	2,827	3,322	2,791
42.....	99,563	3,081	3,222	2,885	3,268	3,069	3,250	2,874	3,297	2,753
43.....	99,524	3,135	3,191	2,936	3,238	3,123	3,222	2,924	3,269	2,712
44.....	99,482	3,194	3,157	2,992	3,205	3,181	3,190	2,980	3,238	2,667
45.....	99,435	3,259	3,120	3,053	3,169	3,244	3,156	3,040	3,205	2,619
46.....	99,385	3,328	3,080	3,119	3,129	3,314	3,119	3,105	3,168	2,567
47.....	99,330	3,404	3,036	3,191	3,087	3,389	3,079	3,176	3,129	2,511
48.....	99,270	3,487	2,989	3,269	3,040	3,470	3,035	3,253	3,086	2,451
49.....	99,205	3,576	2,937	3,353	2,990	3,559	2,987	3,337	3,040	2,386
50.....	99,135	3,673	2,882	3,444	2,936	3,656	2,935	3,427	2,989	2,317
51.....	99,059	3,778	2,821	3,542	2,877	3,760	2,879	3,526	2,934	2,244
52.....	98,978	3,891	2,756	3,648	2,814	3,874	2,818	3,632	2,875	2,166
53.....	98,890	4,013	2,686	3,762	2,745	3,996	2,752	3,746	2,811	2,085
54.....	98,797	4,144	2,611	3,884	2,672	4,128	2,681	3,869	2,743	2,001
55.....	98,697	4,284	2,531	4,014	2,595	4,269	2,605	4,001	2,669	1,914
56.....	98,590	4,433	2,445	4,151	2,512	4,420	2,524	4,141	2,591	1,825
57.....	98,477	4,591	2,354	4,297	2,424	4,581	2,438	4,289	2,507	1,733
58.....	98,356	4,758	2,258	4,449	2,331	4,752	2,346	4,446	2,419	1,639
59.....	98,227	4,934	2,157	4,609	2,234	4,933	2,249	4,611	2,325	1,541
60.....	98,089	5,120	2,050	4,777	2,131	5,125	2,146	4,785	2,227	1,440

TABLE A—*Continued*

1958 C.S.O. 5 PER CENT

Issue Age x	π^{AP}*	No Post-Mortem Dividend				With Post-Mortem Dividend				$10^5 \times P_{x:\overline{10}\rceil}^{\frac{1}{}}$
		D_1^{10}*	D_1^{20}*	D_2^{10}*	D_2^{10}*	D_1^{10}*	D_1^{20}*	D_2^{10}*	D_2^{20}*	
5.....	99,933	3,126	3,192	2,897	3,246	3,127	3,195	2,898	3,249	2,825
15.....	99,914	3,152	3,177	2,921	3,232	3,154	3,180	2,923	3,235	2,810
20.....	99,901	3,166	3,169	2,934	3,224	3,168	3,173	2,935	3,228	2,797
21.....	99,898	3,170	3,166	2,938	3,221	3,171	3,171	2,939	3,226	2,794
22.....	99,894	3,175	3,164	2,942	3,219	3,176	3,169	2,943	3,224	2,789
23.....	99,890	3,180	3,161	2,948	3,216	3,181	3,166	2,948	3,221	2,784
24.....	99,886	3,187	3,157	2,954	3,212	3,187	3,162	2,954	3,218	2,778
25.....	99,880	3,194	3,153	2,961	3,208	3,194	3,159	2,961	3,214	2,771
26.....	99,874	3,203	3,148	2,969	3,203	3,202	3,154	2,969	3,209	2,763
27.....	99,867	3,212	3,142	2,979	3,197	3,212	3,149	2,978	3,204	2,755
28.....	99,859	3,224	3,135	2,990	3,191	3,223	3,143	2,989	3,199	2,745
29.....	99,850	3,237	3,128	3,002	3,184	3,235	3,137	3,001	3,192	2,734
30.....	99,839	3,251	3,120	3,016	3,175	3,249	3,129	3,014	3,185	2,722
31.....	99,828	3,267	3,110	3,032	3,166	3,265	3,121	3,030	3,176	2,709
32.....	99,815	3,286	3,100	3,050	3,156	3,283	3,111	3,047	3,167	2,694
33.....	99,800	3,306	3,088	3,070	3,144	3,303	3,100	3,066	3,156	2,678
34.....	99,784	2,329	3,075	3,091	3,131	3,325	3,088	3,087	3,145	2,661
35.....	99,766	3,354	3,061	3,115	3,117	3,350	3,075	3,111	3,132	2,641
36.....	99,746	3,382	3,045	3,142	3,102	3,377	3,060	3,136	3,117	2,620
37.....	99,724	3,412	3,027	3,170	3,085	3,407	3,044	3,165	3,102	2,597
38.....	99,699	3,446	3,008	3,202	3,066	3,439	3,027	3,195	3,085	2,572
39.....	99,673	3,482	2,987	3,236	3,045	3,475	3,008	3,229	3,066	2,545
40.....	99,643	3,522	2,964	3,273	3,023	3,514	2,986	3,266	3,045	2,516
41.....	99,611	3,565	2,939	3,314	2,999	3,557	2,963	3,306	3,023	2,484
42.....	99,577	3,612	2,912	3,359	2,972	3,604	2,938	3,351	2,998	2,449
43.....	99,539	3,664	2,882	3,407	2,943	3,655	2,911	3,398	2,971	2,411
44.....	99,497	3,720	2,850	3,460	2,912	3,710	2,881	3,451	2,942	2,371
45.....	99,452	3,781	2,815	3,517	2,877	3,771	2,848	3,508	2,911	2,327
46.....	99,403	3,848	2,777	3,579	2,840	3,837	2,813	3,569	2,876	2,281
47.....	99,350	3,920	2,735	3,647	2,800	3,909	2,774	3,636	2,839	2,230
48.....	99,292	3,998	2,690	3,720	2,756	3,987	2,732	3,709	2,798	2,176
49.....	99,229	4,083	2,641	3,799	2,708	4,071	2,687	3,788	2,754	2,118
50.....	99,161	4,175	2,588	3,884	2,657	4,163	2,637	3,874	2,706	2,055
51.....	99,088	4,274	2,531	3,976	2,601	4,263	2,583	3,966	2,654	1,989
52.....	99,008	4,381	2,469	4,076	2,541	4,371	2,525	4,066	2,598	1,919
53.....	98,923	4,497	2,402	4,183	2,477	4,487	2,463	4,174	2,537	1,846
54.....	98,832	4,621	2,331	4,297	2,408	4,613	2,395	4,290	2,472	1,771
55.....	98,735	4,754	2,255	4,418	2,334	4,747	2,323	4,413	2,402	1,693
56.....	98,631	4,894	2,174	4,547	2,256	4,891	2,246	4,545	2,328	1,613
57.....	98,520	5,044	2,088	4,682	2,173	5,044	2,164	4,684	2,249	1,530
58.....	98,402	5,201	1,997	4,825	2,086	5,206	2,077	4,831	2,165	1,445
59.....	98,275	5,368	1,900	4,974	1,994	5,378	1,984	4,986	2,077	1,358
60.....	98,140	5,543	1,799	5,131	1,896	5,560	1,886	5,149	1,984	1,268

NOTE.—π^{AP}: factor applicable to premium when a premium refund is payable on death. D_f^s: factor applicable to the sum of the first s policy years' dividends, when the first dividend is payable for policy year f.

* These values are 10^5 times the values as defined above.

TABLE A—*Continued*

1958 C.S.O. 6 PER CENT

Issue Age x	${}^{*}AP{}^{*}$	No Post-Mortem Dividend				With Post-Mortem Dividend				$10^5 \times P_{x:\overline{20}\rceil}^{\ 1}$
		$D_1^{10}{}^{*}$	$D_1^{20}{}^{*}$	$D_2^{10}{}^{*}$	$D_2^{20}{}^{*}$	$D_1^{10}{}^{*}$	$D_1^{20}{}^{*}$	$D_2^{10}{}^{*}$	$D_2^{20}{}^{*}$	
5.....	99,934	3,655	2,883	3,369	2,950	3,657	2,885	3,370	2,953	2,514
15.....	99,915	3,681	2,868	3,391	2,936	3,683	2,871	3,393	2,940	2,500
20.....	99,902	3,694	2,860	3,403	2,929	3,696	2,864	3,405	2,933	2,489
21.....	99,899	3,698	2,858	3,407	2,927	3,700	2,862	3,409	2,931	2,486
22.....	99,896	3,702	2,855	3,411	2,924	3,704	2,860	3,413	2,929	2,482
23.....	99,892	3,707	2,852	3,416	2,921	3,709	2,857	3,417	2,926	2,477
24.....	99,887	3,713	2,849	3,422	2,918	3,715	2,854	3,423	2,923	2,471
25.....	99,882	3,720	2,845	3,429	2,914	3,721	2,850	3,429	2,919	2,465
26.....	99,876	3,728	2,840	3,436	2,909	3,729	2,846	3,437	2,915	2,458
27.....	99,870	3,738	2,835	3,445	2,904	3,738	2,841	3,446	2,911	2,451
28.....	99,862	3,748	2,829	3,456	2,898	3,748	2,836	3,455	2,905	2,442
29.....	99,853	3,761	2,822	3,467	2,891	3,760	2,829	3,467	2,899	2,432
30.....	99,843	3,774	2,814	3,481	2,883	3,773	2,822	3,480	2,892	2,422
31.....	99,832	3,790	2,805	3,495	2,875	3,789	2,814	3,494	2,884	2,410
32.....	99,820	3,807	2,795	3,512	2,865	3,805	2,805	3,510	2,875	2,396
33.....	99,806	3,827	2,784	3,531	2,854	3,824	2,795	3,528	2,865	2,382
34.....	99,790	3,848	2,771	3,551	2,842	3,846	2,783	3,548	2,854	2,366
35.....	99,773	3,872	2,758	3,573	2,828	3,869	2,771	3,570	2,842	2,348
36.....	99,753	3,898	2,743	3,598	2,814	3,895	2,757	3,595	2,828	2,329
37.....	99,732	3,927	2,726	3,625	2,797	3,923	2,742	3,621	2,813	2,309
38.....	99,708	3,959	2,708	3,655	2,780	3,955	2,725	3,651	2,797	2,286
39.....	99,682	3,993	2,688	3,687	2,760	3,989	2,706	3,682	2,779	2,261
40.....	99,654	4,031	2,666	3,722	2,739	4,026	2,686	3,717	2,759	2,235
41.....	99,623	4,072	2,642	3,760	2,716	4,067	2,664	3,755	2,738	2,206
42.....	99,589	4,117	2,616	3,802	2,691	4,111	2,640	3,797	2,715	2,175
43.....	99,552	4,166	2,588	3,848	2,664	4,160	2,614	3,842	2,689	2,141
44.....	99,512	4,219	2,557	3,897	2,634	4,213	2,586	3,891	2,662	2,104
45.....	99,469	4,277	2,524	3,951	2,601	4,271	2,554	3,945	2,632	2,065
46.....	99,421	4,340	2,488	4,009	2,566	4,334	2,521	4,003	2,599	2,023
47.....	99,369	4,408	2,448	4,072	2,528	4,402	2,484	4,066	2,563	1,977
48.....	99,313	4,482	2,406	4,141	2,486	4,476	2,444	4,135	2,525	1,929
49.....	99,252	4,563	2,359	4,214	2,442	4,556	2,401	4,209	2,483	1,876
50.....	99,186	4,650	2,309	4,294	2,393	4,644	2,353	4,289	2,437	1,820
51.....	99,114	4,744	2,255	4,381	2,340	4,738	2,302	4,376	2,388	1,761
52.....	99,037	4,845	2,196	4,474	2,284	4,841	2,247	4,470	2,335	1,698
53.....	98,954	4,954	2,133	4,573	2,223	4,951	2,188	4,571	2,278	1,632
54.....	98,866	5,072	2,065	4,680	2,158	5,070	2,124	4,680	2,216	1,565
55.....	98,771	5,197	1,993	4,793	2,088	5,198	2,055	4,796	2,150	1,495
56.....	98,669	5,329	1,916	4,913	2,015	5,334	1,982	4,919	2,080	1,423
57.....	98,561	5,470	1,835	5,039	1,937	5,479	1,904	5,049	2,006	1,349
58.....	98,445	5,619	1,748	5,172	1,854	5,633	1,821	5,187	1,927	1,273
59.....	98,321	5,776	1,657	5,310	1,768	5,796	1,733	5,331	1,843	1,195
60.....	98,189	5,941	1,561	5,455	1,676	5,968	1,641	5,483	1,755	1,115

TABLE A—*Continued*

1958 C.S.O. 7 PER CENT

Issue Age x	${}_{\pi}AP*$	No Post-Mortem Dividend				With Post-Mortem Dividend				$10^5 \times P_{x:\overline{20}|}^{\frac{1}{}}$
		$D_1^{10}*$	$D_1^{10}*$	$D_2^{10}*$	$D_2^{10}*$	$D_1^{10}*$	$D_1^{20}*$	$D_2^{10}*$	$D_2^{20}*$	
5.....	99,935	4,158	2,587	3,809	2,670	4,160	2,590	3,811	2,672	2,234
15.....	99,916	4,183	2,573	3,831	2,656	4,185	2,576	3,834	2,659	2,221
20.....	99,903	4,195	2,566	3,842	2,649	4,198	2,569	3,845	2,653	2,211
21.....	99,901	4,199	2,564	3,845	2,647	4,201	2,567	3,848	2,651	2,208
22.....	99,897	4,203	2,561	3,849	2,645	4,205	2,565	3,851	2,649	2,205
23.....	99,893	4,207	2,558	3,854	2,642	4,210	2,563	3,856	2,646	2,200
24.....	99,889	4,213	2,555	3,859	2,639	4,215	2,560	3,861	2,644	2,195
25.....	99,884	4,220	2,551	3,866	2,635	4,222	2,556	3,867	2,640	2,190
26.....	99,879	4,227	2,547	3,873	2,631	4,229	2,552	3,874	2,636	2,184
27.....	99,872	4,236	2,542	3,881	2,626	4,237	2,548	3,882	2,632	2,177
28.....	99,865	4,246	2,536	3,891	2,620	4,247	2,542	3,892	2,627	2,169
29.....	99,856	4,258	2,529	3,902	2,614	4,258	2,536	3,902	2,621	2,160
30.....	99,847	4,271	2,522	3,914	2,606	4,271	2,530	3,914	2,614	2,150
31.....	99,836	4,285	2,514	3,928	2,598	4,285	2,522	3,928	2,607	2,140
32.....	99,825	4,302	2,504	3,944	2,589	4,301	2,513	3,943	2,598	2,128
33.....	99,811	4,320	2,494	3,961	2,579	4,319	2,504	3,960	2,589	2,115
34.....	99,796	4,341	2,482	3,980	2,567	4,339	2,493	3,979	2,578	2,100
35.....	99,779	4,363	2,469	4,001	2,555	4,362	2,481	4,000	2,567	2,085
36.....	99,760	4,388	2,454	4,025	2,541	4,386	2,468	4,023	2,554	2,067
37.....	99,740	4,415	2,439	4,050	2,525	4,413	2,453	4,048	2,540	2,049
38.....	99,717	4,445	2,421	4,077	2,509	4,443	2,437	4,075	2,524	2,028
39.....	99,692	4,478	2,403	4,108	2,490	4,475	2,420	4,105	2,507	2,006
40.....	99,664	4,514	2,382	4,140	2,470	4,511	2,400	4,138	2,489	1,982
41.....	99,634	4,553	2,359	4,176	2,449	4,550	2,379	4,174	2,468	1,956
42.....	99,601	4,595	2,335	4,215	2,425	4,592	2,357	4,213	2,446	1,928
43.....	99,566	4,641	2,308	4,258	2,399	4,638	2,332	4,255	2,422	1,898
44.....	99,527	4,692	2,279	4,304	2,371	4,689	2,305	4,302	2,396	1,865
45.....	99,484	4,746	2,247	4,355	2,340	4,743	2,275	4,352	2,368	1,830
46.....	99,438	4,806	2,213	4,409	2,307	4,803	2,243	4,406	2,337	1,792
47.....	99,388	4,870	2,175	4,468	2,271	4,868	2,208	4,466	2,303	1,751
48.....	99,333	4,940	2,135	4,532	2,232	4,938	2,170	4,530	2,267	1,707
49.....	99,274	5,016	2,091	4,601	2,189	5,015	2,129	4,599	2,227	1,660
50.....	99,209	5,098	2,043	4,675	2,144	5,097	2,084	4,675	2,184	1,610
51.....	99,140	5,187	1,992	4,755	2,094	5,187	2,036	4,756	2,138	1,556
52.....	99,065	5,282	1,937	4,842	2,041	5,284	1,983	4,844	2,088	1,500
53.....	98,984	5,385	1,877	4,935	1,984	5,389	1,927	4,939	2,033	1,441
54.....	98,898	5,496	1,813	5,034	1,922	5,501	1,866	5,040	1,975	1,381
55.....	98,805	5,613	1,745	5,139	1,857	5,622	1,801	5,148	1,913	1,318
56.....	98,706	5,738	1,672	5,250	1,788	5,751	1,732	5,263	1,847	1,254
57.....	98,600	5,871	1,595	5,367	1,714	5,888	1,658	5,385	1,777	1,188
58.....	98,487	6,011	1,514	5,490	1,637	6,033	1,579	5,513	1,702	1,121
59.....	98,365	6,158	1,427	5,619	1,555	6,187	1,496	5,648	1,624	1,051
60.....	98,236	6,313	1,337	5,753	1,470	6,349	1,408	5,789	1,541	979

NOTE.—${}_{\pi}AP$: factor applicable to premium when a premium refund is payable on death. D_f^s: factor applicable to the sum of the first s policy years' dividends, when the first dividend is payable for policy year f.

* These values are 10^5 times the values as defined above.

TABLE A—*Continued*

1958 C.S.O. 8 PER CENT

Issue Age x	π^{AP*}	No Post-Mortem Dividend				With Post-Mortem Dividend				$10^5 \times P_{x:\overline{20}\rceil}^{\frac{1}{}}$
		D_1^{10*}	D_1^{20*}	D_2^{10*}	D_2^{20*}	D_1^{10*}	D_1^{20*}	D_2^{10*}	D_2^{20*}	
5.....	99,935	4,634	2,306	4,220	2,404	4,636	2,308	4,222	2,406	1,982
15.....	99,916	4,657	2,292	4,240	2,391	4,661	2,295	4,243	2,394	1,971
20.....	99,904	4,669	2,285	4,251	2,385	4,672	2,289	4,254	2,388	1,962
21.....	99,902	4,672	2,284	4,254	2,383	4,676	2,287	4,257	2,386	1,959
22.....	99,899	4,676	2,281	4,257	2,380	4,679	2,285	4,260	2,384	1,955
23.....	99,895	4,681	2,279	4,262	2,378	4,684	2,283	4,264	2,382	1,952
24.....	99,891	4,686	2,276	4,267	2,375	4,689	2,280	4,269	2,379	1,947
25.....	99,886	4,692	2,272	4,273	2,371	4,695	2,277	4,275	2,376	1,942
26.....	99,881	4,699	2,268	4,279	2,367	4,702	2,273	4,281	2,372	1,937
27.....	99,875	4,708	2,263	4,287	2,363	4,710	2,268	4,289	2,368	1,930
28.....	99,868	4,717	2,258	4,296	2,357	4,719	2,264	4,298	2,363	1,923
29.....	99,860	4,728	2,252	4,306	2,351	4,729	2,258	4,307	2,358	1,916
30.....	99,851	4,740	2,244	4,318	2,344	4,741	2,251	4,319	2,352	1,907
31.....	99,840	4,754	2,237	4,331	2,337	4,755	2,244	4,331	2,344	1,897
32.....	99,829	4,769	2,228	4,345	2,328	4,770	2,236	4,346	2,336	1,886
33.....	99,816	4,787	2,218	4,362	2,318	4,787	2,227	4,362	2,328	1,875
34.....	99,802	4,806	2,207	4,380	2,308	4,806	2,217	4,379	2,318	1,862
35.....	99,785	4,827	2,194	4,399	2,296	4,827	2,205	4,399	2,307	1,848
36.....	99,767	4,851	2,181	4,421	2,282	4,851	2,193	4,420	2,294	1,832
37.....	99,747	4,877	2,166	4,444	2,268	4,876	2,179	4,444	2,281	1,815
38.....	99,725	4,905	2,149	4,470	2,252	4,904	2,164	4,470	2,266	1,797
39.....	99,700	4,936	2,131	4,498	2,235	4,935	2,147	4,498	2,250	1,777
40.....	99,674	4,969	2,112	4,529	2,216	4,969	2,129	4,529	2,233	1,756
41.....	99,645	5,006	2,091	4,563	2,196	5,006	2,109	4,562	2,214	1,732
42.....	99,613	5,046	2,067	4,599	2,173	5,046	2,087	4,599	2,193	1,707
43.....	99,578	5,090	2,042	4,639	2,149	5,089	2,064	4,638	2,170	1,680
44.....	99,540	5,137	2,015	4,682	2,122	5,137	2,038	4,682	2,146	1,650
45.....	99,499	5,189	1,985	4,729	2,094	5,189	2,010	4,729	2,119	1,619
46.....	99,454	5,245	1,952	4,779	2,062	5,246	1,979	4,780	2,089	1,585
47.....	99,405	5,306	1,917	4,834	2,028	5,307	1,946	4,835	2,058	1,548
48.....	99,352	5,372	1,878	4,893	1,992	5,374	1,910	4,896	2,023	1,509
49.....	99,294	5,443	1,837	4,957	1,952	5,446	1,871	4,961	1,986	1,466
50.....	99,232	5,520	1,792	5,027	1,909	5,524	1,829	5,031	1,946	1,421
51.....	99,164	5,604	1,743	5,101	1,862	5,609	1,783	5,107	1,902	1,374
52.....	99,091	5,694	1,691	5,182	1,812	5,701	1,733	5,189	1,855	1,323
53.....	99,012	5,790	1,635	5,268	1,758	5,800	1,680	5,277	1,804	1,271
54.....	98,928	5,894	1,574	5,360	1,701	5,906	1,623	5,372	1,749	1,217
55.....	98,838	6,005	1,510	5,457	1,640	6,020	1,561	5,473	1,691	1,161
56.....	98,741	6,122	1,441	5,560	1,574	6,141	1,495	5,580	1,628	1,104
57.....	98,637	6,246	1,369	5,668	1,506	6,271	1,425	5,693	1,562	1,045
58.....	98,526	6,378	1,292	5,782	1,433	6,408	1,351	5,812	1,492	985
59.....	98,407	6,516	1,211	5,901	1,356	6,553	1,273	5,937	1,418	923
60.....	98,280	6,661	1,125	6,024	1,276	6,706	1,190	6,069	1,341	860

TABLE B

INITIAL CASH-VALUE REDISTRIBUTION FACTORS $(\ddot{a}_{x:\overline{10}|})^{-1}$

(Mortality, 1958 C.S.O.)

ISSUE AGE x	INTEREST RATE							
	1%	2%	3%	4%	5%	6%	7%	8%
5.....	5,555	6,068	6,601	7,154	7,724	8,309	8,908	9,520
15.....	5,577	6,090	6,625	7,178	7,749	8,335	8,935	9,547
20.....	5,588	6,102	6,637	7,191	7,763	8,349	8,950	9,562
21.....	5,591	6,105	6,640	7,194	7,765	8,352	8,953	9,565
22.....	5,593	6,108	6,643	7,197	7,768	8,355	8,956	9,568
23.....	5,596	6,111	6,646	7,200	7,772	8,358	8,959	9,571
24.....	5,600	6,114	6,649	7,204	7,775	8,362	8,963	9,575
25.....	5,604	6,118	6,654	7,208	7,780	8,367	8,967	9,580
26.....	5,608	6,123	6,659	7,213	7,785	8,372	8,973	9,585
27.....	5,614	6,129	6,664	7,219	7,791	8,378	8,979	9,591
28.....	5,620	6,135	6,671	7,226	7,798	8,385	8,986	9,598
29.....	5,627	6,143	6,679	7,234	7,806	8,393	8,994	9,607
30.....	5,635	6,151	6,688	7,243	7,815	8,403	9,003	9,616
31.....	5,645	6,161	6,698	7,253	7,826	8,413	9,014	9,627
32.....	5,656	6,172	6,709	7,265	7,838	8,425	9,027	9,639
33.....	5,668	6,185	6,722	7,278	7,851	8,439	9,041	9,654
34.....	5,682	6,200	6,737	7,294	7,867	8,455	9,057	9,670
35.....	5,698	6,216	6,754	7,311	7,885	8,474	9,076	9,689
36.....	5,716	6,235	6,774	7,331	7,905	8,494	9,097	9,710
37.....	5,736	6,255	6,795	7,353	7,928	8,518	9,120	9,734
38.....	5,758	6,279	6,819	7,378	7,953	8,543	9,146	9,761
39.....	5,783	6,304	6,846	7,405	7,981	8,572	9,175	9,790
40.....	5,810	6,332	6,875	7,435	8,012	8,603	9,207	9,823
41.....	5,840	6,363	6,907	7,468	8,046	8,638	9,243	9,858
42.....	5,872	6,397	6,942	7,504	8,083	8,676	9,281	9,897
43.....	5,908	6,435	6,980	7,544	8,123	8,717	9,323	9,940
44.....	5,948	6,476	7,023	7,588	8,168	8,763	9,369	9,987
45.....	5,992	6,521	7,069	7,635	8,217	8,813	9,420	10,038
46.....	6,040	6,571	7,121	7,688	8,271	8,868	9,476	10,095
47.....	6,092	6,625	7,177	7,746	8,330	8,928	9,538	10,157
48.....	6,150	6,685	7,239	7,810	8,395	8,994	9,605	10,225
49.....	6,214	6,751	7,307	7,879	8,467	9,067	9,679	10,300
50.....	6,283	6,823	7,381	7,956	8,545	9,147	9,759	10,382
51.....	6,360	6,903	7,463	8,039	8,630	9,234	9,848	10,471
52.....	6,444	6,990	7,552	8,131	8,724	9,329	9,944	10,568
53.....	6,537	7,085	7,650	8,231	8,826	9,433	10,050	10,675
54.....	6,638	7,189	7,758	8,341	8,938	9,547	10,165	10,791
55.....	6,749	7,304	7,875	8,462	9,061	9,671	10,291	10,918
56.....	6,871	7,429	8,004	8,593	9,194	9,807	10,428	11,057
57.....	7,004	7,566	8,144	8,736	9,340	9,955	10,578	11,208
58.....	7,149	7,716	8,297	8,892	9,499	10,116	10,741	11,372
59.....	7,307	7,878	8,464	9,062	9,672	10,291	10,918	11,551
60.....	7,480	8,056	8,646	9,248	9,860	10,481	11,110	11,744

NOTE.—Actual redistribution factors are 10^{-6} times the values tabulated.

TABLE C.—Five-Year Term Premium Redistribution Factors

Issue Age x	Interest Rate 1%				2%			
	f_0	f_5	f_{10}	f_{15}	f_0	f_5	f_{10}	f_{15}
0–32..	27,505	25,852	24,193	22,450	29,447	26,347	23,471	20,735
33–36..	27,785	26,001	24,128	22,086	29,730	26,485	23,397	20,388
37.....	27,949	26,080	24,089	21,882	29,897	26,557	23,351	20,195
38.....	28,044	26,125	24,065	21,766	29,993	26,598	23,324	20,084
39.....	28,149	26,174	24,038	21,639	30,099	26,643	23,294	19,963
40.....	28,264	26,228	24,008	21,500	30,216	26,693	23,260	19,831
41.....	28,390	26,287	23,974	21,349	30,344	26,746	23,223	19,688
42.....	28,529	26,350	23,937	21,184	30,484	26,804	23,181	19,531
43.....	28,681	26,419	23,896	21,004	30,638	26,867	23,135	19,360
44.....	28,849	26,494	23,850	20,807	30,808	26,935	23,084	19,174
45.....	29,032	26,575	23,799	20,594	30,994	27,008	23,027	18,971
46.....	29,234	26,662	23,742	20,362	31,197	27,087	22,964	18,752
47.....	29,454	26,757	23,679	20,110	31,420	27,173	22,894	18,513
48.....	29,696	26,859	23,608	19,837	31,664	27,265	22,816	18,254
49.....	29,960	26,970	23,529	19,541	31,931	27,365	22,730	17,974
50.....	30,249	27,090	23,442	19,219	32,223	27,473	22,634	17,670
51.....	30,566	27,219	23,344	18,871	32,542	27,589	22,528	17,341
52.....	30,914	27,358	23,235	18,494	32,892	27,713	22,410	16,985
53.....	31,294	27,506	23,113	18,087	33,275	27,845	22,278	16,602
54.....	31,710	27,664	22,975	17,651	33,693	27,986	22,130	16,191

Note.—Values quoted for issue ages 0–32 and 33–36 are those for ages 30 and 35, respectively. Mortality, 1958 C.S.O. $f_r = 10^5 \cdot (N_{x+r} - N_{x+r+5})/(N_x - N_{x+20})$. Actual redistribution factors are 10^{-5} times the values tabulated.

TABLE C—*Continued*

Issue Age x	Interest Rate 3%				4%			
	f_0	f_5	f_{10}	f_{15}	f_0	f_5	f_{10}	f_{15}
0–32..	31,412	26,768	22,711	19,109	33,392	27,113	21,920	17,574
33–36..	31,697	26,894	22,628	18,781	33,678	27,228	21,829	17,265
37.....	31,866	26,959	22,578	18,597	33,847	27,286	21,775	17,092
38.....	31,963	26,997	22,548	18,493	33,945	27,320	21,743	16,993
39.....	32,070	27,037	22,514	18,378	34,053	27,356	21,707	16,885
40.....	32,187	27,082	22,477	18,253	34,170	27,396	21,667	16,767
41.....	32,316	27,130	22,436	18,117	34,300	27,439	21,623	16,639
42.....	32,458	27,182	22,391	17,969	34,442	27,485	21,574	16,499
43.....	32,613	27,239	22,340	17,807	34,598	27,535	21,520	16,347
44.....	32,784	27,300	22,285	17,631	34,769	27,589	21,461	16,181
45.....	32,971	27,366	22,223	17,440	34,957	27,647	21,395	16,001
46.....	33,176	27,436	22,155	17,233	35,162	27,709	21,323	15,806
47.....	33,401	27,512	22,079	17,008	35,387	27,776	21,242	15,594
48.....	33,646	27,595	21,996	16,764	35,633	27,848	21,154	15,365
49.....	33,914	27,683	21,903	16,499	35,901	27,926	21,056	15,117
50.....	34,207	27,779	21,801	16,213	36,194	28,009	20,948	14,848
51.....	34,528	27,881	21,687	15,903	36,515	28,098	20,829	14,558
52.....	34,879	27,991	21,561	15,569	36,865	28,193	20,697	14,244
53.....	35,262	28,107	21,422	15,209	37,248	28,294	20,551	13,907
54.....	35,681	28,230	21,266	14,823	37,665	28,399	20,389	13,547

TABLE C—*Continued*

Issue Age x	Interest Rate							
	5%				6%			
	f_0	f_5	f_{10}	f_{15}	f_0	f_5	f_{10}	f_{15}
0–32..	35,379	27,385	21,106	16,131	37,364	27,582	20,275	14,779
33–36..	35,664	27,487	21,008	15,840	37,648	27,673	20,172	14,507
37.....	35,833	27,539	20,950	15,678	37,816	27,718	20,112	14,354
38.....	35,931	27,568	20,916	15,585	37,913	27,743	20,076	14,267
39.....	36,039	27,600	20,878	15,483	38,020	27,771	20,036	14,172
40.....	36,157	27,635	20,836	15,373	38,138	27,801	19,993	14,069
41.....	36,286	27,672	20,790	15,252	38,267	27,833	19,944	13,956
42.....	36,428	27,713	20,738	15,121	38,408	27,868	19,891	13,833
43.....	36,584	27,757	20,681	14,978	38,563	27,906	19,832	13,699
44.....	36,755	27,804	20,619	14,823	38,733	27,946	19,767	13,554
45.....	36,942	27,854	20,550	14,654	38,920	27,988	19,696	13,396
46.....	37,147	27,908	20,474	14,471	39,123	28,034	19,617	13,225
47.....	37,371	27,966	20,391	14,272	39,346	28,083	19,531	13,040
48.....	37,616	28,028	20,298	14,058	39,590	28,135	19,435	12,840
49.....	37,884	28,094	20,196	13,825	39,855	28,191	19,331	12,623
50.....	38,176	28,166	20,084	13,574	40,145	28,250	19,215	12,389
51.....	38,495	28,242	19,960	13,303	40,462	28,314	19,088	12,136
52.....	38,844	28,322	19,824	13,010	40,807	28,380	18,949	11,864
53.....	39,224	28,407	19,673	12,696	41,184	28,450	18,795	11,571
54.....	39,639	28,495	19,507	12,359	41,595	28,522	18,625	11,259

TABLE C—*Continued*

Issue Age x	Interest Rate							
	7%				8%			
	f_0	f_5	f_{10}	f_{15}	f_0	f_5	f_{10}	f_{15}
0–32..	39,339	27,709	19,434	13,517	41,299	27,768	18,590	12,343
33–36..	39,621	27,788	19,328	13,263	41,576	27,835	18,482	12,107
37.....	39,788	27,826	19,265	13,121	41,742	27,867	18,417	11,974
38.....	39,884	27,848	19,229	13,039	41,837	27,885	18,380	11,898
39.....	39,991	27,871	19,188	12,951	41,942	27,904	18,338	11,816
40.....	40,107	27,896	19,142	12,854	42,057	27,925	18,292	11,726
41.....	40,235	27,924	19,093	12,749	42,184	27,947	18,241	11,628
42.....	40,375	27,953	19,038	12,634	42,322	27,971	18,185	11,522
43.....	40,529	27,985	18,977	12,510	42,474	27,996	18,124	11,406
44.....	40,697	28,018	18,911	12,374	42,641	28,023	18,056	11,280
45.....	40,882	28,053	18,838	12,227	42,823	28,051	17,982	11,143
46.....	41,084	28,091	18,757	12,068	43,023	28,081	17,901	10,995
47.....	41,305	28,131	18,669	11,895	43,241	28,113	17,811	10,835
48.....	41,546	28,173	18,572	11,709	43,478	28,146	17,713	10,662
49.....	41,809	28,219	18,465	11,508	43,738	28,182	17,605	10,475
50.....	42,096	28,267	18,348	11,290	44,021	28,219	17,487	10,274
51.....	42,408	28,318	18,219	11,055	44,329	28,258	17,357	10,056
52.....	42,750	28,371	18,077	10,802	44,665	28,298	17,215	9,822
53.....	43,122	28,426	17,922	10,531	45,031	28,339	17,058	9,571
54.....	43,527	28,482	17,750	10,241	45,430	28,380	16,887	9,304

NOTE.—Values quoted for issue ages 0–32 and 33–36 are those for ages 30 and 35, respectively. Mortality, 1958 C.S.O. $f_r = 10^5 \cdot (N_{x+r} - N_{x+r+5})/(N_x - N_{x+30})$. Actual redistribution factors are 10^{-5} times the values tabulated.

TABLE D

FIVE-YEAR RENEWABLE TERM PREMIUM WEIGHTS K'_r AND LOADED AVERAGE MORTALITY RATES 1,000 Q'_x

(1958 C.S.O. 5 Per Cent)

r	λ (INITIAL CASH-SURRENDER VALUE)/(END CASH-SURRENDER VALUE)					
	0–0.05	0.05–0.15	0.15–0.25	0.25–0.35	0.35–0.45	0.45–0.55
	K'_r					
0	0.12459	0.17393	0.21359	0.24615	0.27336	0.29645
1	.26032	.26676	.27194	.27620	.27975	.28277
2	.33144	.31125	.29503	.28170	.27057	.26112
3	0.35958	0.32398	0.29537	0.27188	0.25225	0.23559
x	1,000 Q'_x					
20	2.44	2.40	2.37	2.35	2.32	2.31
21	2.55	2.50	2.47	2.44	2.41	2.39
22	2.68	2.62	2.58	2.54	2.51	2.49
23	2.82	2.76	2.71	2.67	2.63	2.60
24	2.99	2.92	2.86	2.81	2.76	2.73
25	3.19	3.10	3.02	2.97	2.92	2.87
26	3.40	3.30	3.22	3.15	3.09	3.04
27	3.65	3.53	3.43	3.35	3.29	3.23
28	3.93	3.79	3.68	3.58	3.51	3.44
29	4.23	4.08	3.95	3.85	3.76	3.68
30	4.58	4.40	4.26	4.14	4.04	3.96
31	4.97	4.76	4.60	4.47	4.36	4.26
32	5.40	5.17	4.99	4.83	4.71	4.60
33	5.87	5.62	5.41	5.24	5.10	4.98
34	6.40	6.11	5.88	5.70	5.54	5.41
35	6.98	6.66	6.41	6.20	6.03	5.88
36	7.61	7.26	6.98	6.75	6.56	6.40
37	8.31	7.92	7.62	7.36	7.15	6.97
38	9.07	8.65	8.31	8.04	7.80	7.61
39	9.91	9.45	9.08	8.77	8.52	8.30
40	10.82	10.32	9.91	9.58	9.30	9.07
41	11.83	11.27	10.83	10.47	10.16	9.90
42	12.92	12.32	11.83	11.43	11.10	10.82
43	14.12	13.46	12.93	12.49	12.13	11.82
44	15.43	14.71	14.13	13.65	13.25	12.91
45	16.87	16.07	15.44	14.92	14.48	14.11
46	18.43	17.57	16.87	16.30	15.82	15.42
47	20.14	19.20	18.44	17.82	17.30	16.85
48	22.01	20.98	20.15	19.47	18.91	18.42
49	24.06	22.93	22.03	21.29	20.67	20.14
50	26.30	25.07	24.08	23.27	22.59	22.02
51	28.74	27.40	26.32	25.43	24.70	24.07
52	31.38	29.92	28.75	27.78	26.98	26.29
53	34.23	32.64	31.37	30.32	29.44	28.70
54	37.28	35.56	34.18	33.04	32.10	31.29

NOTE.—The age x for which the weighted average term premium most nearly equals 1,000 Q'_x is used in determining illustrative yields of permanent insurance over five-year renewable term insurance.