TRANSACTIONS OF SOCIETY OF ACTUARIES
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DIGEST OF DISCUSSION OF SUBJECTS OF SPECIAL INTEREST

ORDINARY INSURANCE PROBLEMS

1958 CSO Mortality Table

A. In conjunction with the adoption of the 1958 CSO Mortality Table, what considerations are involved in deciding whether or not to
   (i) Use continuous functions?
   (ii) Use ages last birthday?
   (iii) Change reserve methods, such as from CRVM or Canadian modified reserves to net level reserves?

B. Is the 1958 CSO Table likely to be adopted for use in Canada as a basis for nonforfeiture values and reserves by companies doing business in both countries? By companies doing business in Canada only?

C. Does the increase in the periods for which a policy can be carried under extended insurance make it desirable to include in automatic premium loan provisions an automatic change to extended insurance after a limited number of premiums have been paid by automatic loan?

Toronto Regional Meeting

MR. JOSEPH C. NOBACK: Every company should use continuous functions for death benefits because such benefits are payable at the date of death, not at the end of the year of death. This is especially true for those companies which pay interest from date of death to date of payment. Discrete functions are properly used for the life annuity factors in premium calculations (1) if it is required that premiums be paid to the end of the year and any unpaid fractional premiums are deducted from the death proceeds, or (2) if fractional premiums due after the date of death are waived but no refund of the unearned portion of the premiums already paid is made. In the latter case, a reserve for the nondeduction of fractional premiums is required. If however, the unearned portion of a premium is refunded at death, continuous annuity functions should be used. The widespread use of discrete functions appears to have arisen from the ease of explanation to beginners unfamiliar with the calculus. This excuse no longer applies to Society members and the introduction of the 1958 CSO Table is the opportunity to make this change.

As for using age last birthday, while common usage and the experience of the Metropolitan favor it, there are reasons for not changing from age nearest birthday. These are: (1) it is industry tradition; (2) field forces

like it; (3) it is simpler and cheaper to continue the present convention; (4) it avoids complications such as special contract language, adjusting existing mortality statistics, explanations of the change to policyholders with both policy types, and special Pension Trust problems.

MR. GEORGE FISANICK: Metropolitan adopted the age last birthday basis for its Ordinary policies on January 1, 1960 on the 1941 CSO Mortality Table at 2½%. The introduction was discussed by Mr. F. P. Chapman of our Company in *TSA* XII, pp. 115–116. The experience with the new age basis has been eminently satisfactory with the field force, the underwriters and the public. No special administrative difficulties have occurred and there are definitely fewer errors in insuring ages on applications and fewer requests for dating back. New rates adopted in Canada at the beginning of 1961 are based on age last birthday on 1958 CSO Table at 3%, with extended term on the 1958 CET Table at 3%. Allowance for immediate payment of death benefits is included. For companies considering the adoption of age last birthday in conjunction with the 1958 CSO Table, Metropolitan has prepared a book of basic values, net premiums and reserves at 3% (reproductions of Univac tabulation sheets) about which inquiries are welcomed. Also, elementary functions for 1958 CSO and 1958 CET Tables on age last birthday are available on the last two pages of Volume I, Basic Values, of the Society's *Monetary Tables* volumes. Commutation tables at 2½% and 3% are available in 1960 *TSA* XII, pp. 330–345 and 349–352.

MR. WILLIAM E. LEWIS: This discussion is limited to the effect on federal income taxes of a choice between different reserve methods. Perhaps the most important decision lies between net level and modified preliminary term (MPT) reserves. The following considerations are important in determining the effect of net level reserves on taxes:

1. A company that has taken the net level election under Sec. 818(c) actually has no choice insofar as tax consequences are concerned. The tax return would be prepared using net level reserves in either case. There would be a small difference between actual net level reserves and the approximate reserves permitted by Sec. 818(c), but the difference would not ordinarily be large enough to govern the choice of reserve methods.

2. The reserve method that is chosen will have an effect upon the following elements in the tax formula:

a) The reserves used to compute policy reserve requirements and, from this, the Phase 1 tax.

In order to illustrate the tax effect in Phase 1 of two different reserve methods, we may assume an initial difference of $1,000 between net level and MPT reserves. Disregarding the refinements necessary in using mean values

in the tax formula, the effect on Phase 1 in the first year would be the product of $1,000, the tax rate (52%), the percentage applied to compute adjusted reserves (assume 85%), and the current or average earnings rate (assume 4%). This calculation produces a tax saving of $17.68 per thousand of reserve difference. If it is assumed that the reserve difference decreases uniformly to zero over twenty years, the total tax savings would be twenty times $17.68 divided by two, or $176.80 per $1,000.

b) The increase in reserves used to compute the net gain from operation, and from this (together with the Phase 1 taxable income) the Phase 2 and Phase 3 taxes, if any.

The effect of $1,000 additional increase in reserve the first policy year on the net level basis, as compared to MPT, would be to reduce the net gain from operations by $1,000. In renewal years, the net gains would of necessity aggregate $1,000 more on the net level basis as compared to the MPT reserve basis. The effect on taxes would depend upon the basis on which the company pays its tax, whether Phase 1 only, Phase 2 with or without Phase 3, or the net gain (or loss) from operations. The individual cases are considered later in this discussion.

Frequently it will be found that the higher net level reserve basis will significantly alter the incidence of taxation even though the aggregate gains from operation are the same on either reserve basis at the end of the reserve modification period. The deferral of taxation, and interest earned thereon, can be important considerations, however, to many companies.

c) The tax exempt interest and dividends received credits.

Both in Phase 1 and in the net gain from operations, the tax exempt interest credit is dependent upon the company's share ratio of investment yield. The larger the reserve, the larger the policyholder's share of investment yield, and the smaller the tax exempt interest credit. This is a permanent credit and not merely tax deferral; consequently, different reserve methods will produce real differences in tax because of the credits for tax exempt interest and dividends received.

The individual situations can now be considered. The discussion does not attempt to evaluate the benefits of tax deferral or the difference in the tax exempt interest credit, although these are points that companies would want to consider in making their own studies.

Tax Based on Phase 1 Only (less special deductions up to $250,000)

A company whose tax with MPT reserves is based on Phase 1 (less special deductions up to $250,000) would most often continue to pay a Phase 1 only tax under a net level reserve system. The effect of $1,000 additional net level reserve in Phase 1 would be a tax saving of $17.68 the first year and $176.80 for the full twenty year period. This saving is permanent since a company in this category is not concerned with Phase 2 or Phase 3 taxes.

Tax Based on Phases 1 and 2 (using either net level or MPT reserves)

In this example, it is assumed that higher net level reserves will reduce, but not eliminate entirely, the Phase 2 tax. The effect of $1,000 additional net level reserve may be considered in three parts, as follows:

1. The higher policy reserve requirements would produce a tax saving on the investment yield in Phase 1 and Phase 2 combined of one-half the amount saved in Phase 1 alone, or $88.40 per $1,000 of extra net level reserve. The amount is only one-half because Phase 2 taxes are increased by one-half of any reduction in Phase 1 taxes.

2. The additional $1,000 increase in reserve would save $260.00 in Phase 2 taxes the first policy year. Phase 2 taxes in renewal years would be increased by an aggregate of $260.00 spread over the reserve modification period. Phase 2 taxes which are dependent on the increase in reserve would, therefore, be the same under any reserve system except for the effect of interest earned as the result of tax deferral and differences in the tax exempt interest credits.

3. The combined effect of the two preceding factors is a reduction of the total tax over the twenty year period of $88.40. Since the net gain from operations is the same on the date the two reserve bases become equal, it is apparent that potential Phase 3 taxes must be $88.40 higher under the net level reserve system. For a company that is not subject to the Phase 3 tax, a permanent saving of $88.40 would result. Otherwise, the reduction in taxes is a deferral to Phase 3 at some future, indeterminate date.

Tax Based on Phases 1 and 2 (MPT reserves) Changed to Net Gain from Operations (Net Level reserves)

The most probable situation in these circumstances is that net level reserves would shift the tax base for the company as a whole from Phases 1 and 2 to the net gain from operations for a period of years during which new business predominates. At some future date, as the higher renewal earnings under a net level system offset the effect of current new business, the tax base would revert to Phases 1 and 2.

Let a = period of years during which tax is based on the net gain from operations

b = succeeding period during which the tax base reverts to Phases 1 and 2

$b = 20 - a$

${}^{t}(\text{Phase 3})_{NL}$ = Phase 3 taxes during period of t years on the net level reserve basis

${}^{t}NGO_{NL}$ = Net gains from operation during period of t years on the net level reserve basis

At the end of twenty years, the taxes paid plus the potential amount in Phase 3 equals the tax on the total gains from operation for the twenty year period. The net gains from operation for this twenty year period total the same under either a net level or an MPT reserve method. Therefore, $^{b}(\text{Phase 3})_{\text{NL}}$ must be compared with $^{a+b}(\text{Phase 3})_{\text{MPT}}$ in order to determine under which reserve method there is a greater potential amount of Phase 3 tax and, consequently, a smaller amount of tax paid by the end of twenty years.

but $^{b}(\text{Phase 3})_{\text{NL}} = {}^{b}(\text{Phase 3})_{\text{MPT}} + {}^{b}(\text{Phase 2})_{\text{NL}} - {}^{b}(\text{Phase 2})_{\text{MPT}}$
and $^{a+b}(\text{Phase 3})_{\text{MPT}} = {}^{b}(\text{Phase 3})_{\text{MPT}} + {}^{a}(\text{Phase 2})_{\text{MPT}}$,

which reduces the comparison to:

$$^{b}(\text{Phase 2})_{\text{NL}} - {}^{b}(\text{Phase 2})_{\text{MPT}} \textit{ vs. } {}^{a}(\text{Phase 2})_{\text{MPT}}.$$

This comparison could be greater on either side. It would depend primarily on how soon the company's tax base, with net level reserves, reverted to Phases 1 and 2 from the net gain from operations. Certain conclusions may be drawn, as follows:

1. On the one hand, total potential Phase 3 taxes for b years on the net level reserve basis may be less than Phase 3 taxes for $a + b$ years based on MPT reserves. This means that total taxes paid in all phases are necessarily greater. For a stock company, this situation results in a smaller amount of tax being deferred to Phase 3 under a net level reserve system. For a mutual company, not subject to Phase 3 tax, the choice of net level reserves would under these conditions result in permanently *higher* taxes. The higher tax would apply only to a relatively few years of issue at the beginning of the change from MPT to net level reserves, since ultimately the tax base must revert to Phases 1 and 2. Here there is a definite tax saving for mutual companies, as was indicated previously.

2. On the other hand, the potential Phase 3 taxes for b years based on net level reserves may exceed the aggregate Phase 3 taxes based on MPT reserves for $a + b$ years. If so, a stock company would find that more of its tax would be deferred to Phase 3 by the choice of net level reserves. A mutual company under these conditions would find its taxes actually reduced. The reduction would apply only to the beginning years of issue, depending on the time required for the tax base to revert to Phases 1 and 2. Thereafter, the advantages in net level reserves would be the same as for any company whose tax is based on Phases 1 and 2.

Tax Based on Net Gain from Operations (MPT reserves)

If the tax base with MPT reserves is the net gain from operations, the use of net level rather than MPT reserves will at first reduce taxable in-

come. Later, as the higher renewal gains based on net level reserves offset the additional net level reserve on current new insurance, the company's taxable income will be increased. Most frequently, the effect will be to alter the incidence of taxation but not the absolute amount. An exception can occur when the larger renewal earnings in the later years are sufficient to create a Phase 3 tax position for the company. In this situation, net level reserves are even more advantageous, since for mutual companies the Phase 3 income is not taxable, while, for stock companies, increased Phase 3 taxes represent a greater degree of tax deferral.

If losses from operation are produced, however, the company should carefully consider whether or not the loss carry-overs are apt to be utilized. Taxes could be increased through the choice of net level reserves in the event that losses are produced which cannot subsequently be used to offset the higher renewal gains.

One further point, not related to the question of net level reserves, concerns the possible choice of continuous functions reserves. These reserves are less than conventional mean reserves if we include additional reserves for immediate payment of claims, nondeduction of deferred premiums and pro-rata return of premiums in our definition of conventional mean reserves. The continuous functions reserves would be less by approximately the amount of the asset for deferred premiums. For many companies, the result would be an increase in taxes because of the smaller policy reserve requirements in Phase 1.

Reference was made to the net level election provided by Sec. 818(c). It should be pointed out that the companies have until July 4, 1961, to reconsider certain elections which they did or did not make in computing their 1958, 1959 and 1960 tax returns. A previous election made under Sec. 818(c) may be revoked, or it may yet be made, for these three years, provided action is taken before July 4th, 1961, and amended returns filed. Many companies have reviewed their initial appraisal of the Sec. 818(c) election, both as it affects new business and existing business on December 31, 1957, and have found that, over-all, it may be advantageous to reverse their original action.

MR. LYALL M. SPRUNG: In regard to section B, the Mutual Life of Canada, operating exclusively in Canada, calculates its participating premiums, nonforfeiture values and reserves on the A24–29 Mortality Table, a British table now over 30 years old. A proper mortality table for valuation purposes is one paralleling the company's mortality experience by age, and the 1958 CSO Table as well as the 1952–56 Canadian Association of Actuaries Ultimate Table were examined from this point of view. A margin of 10% of q_x would probably be added to the 1952–56 C.A.A. Table if it were to be used. Tests of mortality experience for

durations 6 and over showed a 98.8% ratio of actual to expected deaths by number and 99.9% by amount for 1952–56 C.A.A. Table and 95.6% by number and 96.1% by amount for the 1958 CSO Basic Table.

A comparison of reserves for a model company, constructed to reflect present business distribution by plan and age as well as transaction rates, showed that at the end of 20 years, on $7 billion in force, 1958 CSO 2½% reserves would be 2/3 of 1% lower and the 110% 1952–56 C.A.A. 2½% reserves only 1.2% lower than the present A24–29 2½%. Because the differences are so small, the fact that the C.A.A. Table more closely parallels mortality experience for the Mutual would lead to the adoption of the 1952–56 C.A.A. Table if a change were to be made. Also, a table based upon Canadian mortality experience has some merit for us from a public relations standpoint.

Because premium loadings would be more conservative for a new table, offsetting part of the reduction in gross premiums, no change is to be made at this time.

MR. HUGH STEPHENSON: A survey of companies doing business in Canada showed that of those which operated also in the U.S. the great majority used the 1941 CSO Table for reserves and nonforfeiture values on their Canadian business. Among those not operating in the U.S., however, there was considerable diversity of practice, with many companies preferring Canadian and British tables. Presumably this pattern will continue with respect to the 1958 CSO Table.

The Manufacturers Life recently adopted the 1958 CSO 3% Table for reserves in Canada and the 1958 CSO and CET Tables at 3½% for nonforfeiture values.

MR. ROBERT C. DOWSETT: A study was made of the reserve basis at the end of 1959, updated where possible to 1960, for new Canadian ordinary policies, used by 67 major companies operating in Canada (see accompanying table). Canadian statutes do not require cash values

Major Companies Operating in Canada	Number of Companies Using:						
	1941 CSO	1958 CSO	CM(5)	AM(5)	A24–29	C49–52 Modified	Total
(1) Not active in U.S.	10	1	5	7	17	1	41
(2) Canadian companies relatively inactive in U.S.	0	0	2	2	0	0	4
(3) Canadian companies relatively active in U.S.	6	1	0	0	0	0	7
(4) U.S. companies	15	0	0	0	0	0	15
Total	31	2	7	9	17	1	67

and the incentive to revise reserve bases is not as great as it is in the United States.

Most of the ten companies in group 1 using the 1941 CSO Table are younger companies with a great proportion of their business put in force since that table became available; for these companies, there are no strong compelling reasons for switching to 1958 CSO, other than the existence of many published figures based on that table. If cash values for new issues are revised, corresponding reserves need not necessarily be revised, but if a change in reserve interest rate is contemplated there is some argument for the use of mortality based on recent North American experience.

The four companies in group 2 have not used 1941 CSO for Canadian business, although they have for their United States business. These are older well-established companies and they might be expected to continue using existing tables.

The six Canadian companies doing a large volume of business in the United States and now using 1941 CSO may be expected to switch to the 1958 CSO for their Canadian business to retain uniformity of operation.

In due course I expect that the 15 United States companies will use 1958 CSO for new Canadian business.

MR. MELVIN C. PRYCE: The London Life uses the C.A.A. 49–52 Table, and has not seriously considered using the 1958 CSO Table because it neither represents the level of, nor is parallel to, our mortality experience. Ratios of q_x's on the 1958 CSO to C.A.A. 49–52 vary from 74% at young ages to a minimum of 42%, then increase to 50% at 35 and a maximum of 93% at 65. The adoption of the 1958 CSO Table would cause significant changes in premiums, reserves, cash values and dividends.

MR. JOHN C. MAYNARD: A Canadian company has complete freedom of choice concerning the application of the 1958 CSO Table to its Canadian business, as deficiency reserves and nonforfeiture values are not required. Advantages in changing to the same table for both U.S. and Canadian business are:

(1) The same principles of reserve valuation can be applied simply to all North American business;
(2) The same philosophy concerning development of surplus can be applied uniformly;
(3) The widest consistency in, and control of, nonforfeiture values will result.

The mortality margin in the 1958 Table is more representative of current conditions in Canada than the 1941 Table, bringing more realism into each of the three elements in gross premiums and in gain and loss

analyses. The reduction in valuation net premiums will provide relief because of lower unearned premium reserves for YRT reinsurance.

If a company does business in Great Britain, it must make a report to the British Board of Trade, giving a comparison of gross premiums and valuation net premiums for total insurance business divided into participating and nonparticipating. The test of an aggregate deficiency reserve on its total nonparticipating business has been a significant item for The Canada Life in recent years.

The 1958 Table is suitable for reserves in Canada and, if chosen, becomes a desirable choice for cash values. Reasons for moving to the 1958 CSO Table are likely to be heightened by competitive considerations, since the U.S. companies will almost certainly make the change for their Canadian business and the lower cash values are likely to be reflected in lower premiums.

For extended insurance, the 1958 CSO Table does not have much, if any, margin at ages over 50 for both extra mortality and expense. The CET Table does have an adequate margin and is suitable for this purpose.

Tests in The Canada Life showed the 1958 CSO Table suitable for paid-up insurance because the "break-even" amount was well below the average of amounts in force. However, in order to avoid inconsistent results on limited payment plans, there is an advantage in using the CET Table for both paid-up insurance and extended insurance, and it is anticipated that it will be so used by Canadian companies for their Canadian business.

On section C, for extended insurance calculated on the CET Table, short periods of term insurance in the age range from 30 to 45 will show an increase of about 30% over 1941 CSO periods, but periods running to the higher ages will have a much smaller increase or even a decrease. If the new basis is the 1958 CSO Table, short term periods from 30 to 45 increase about 50%, and periods running to the higher ages, about 20%.

There is a lack of refinement in determining extended insurance periods because the purchase basis (1) remains fixed for long periods of time and then changes suddenly, (2) depends on the date of issue, (3) is usually nonparticipating, and (4) makes no allowance for factors such as gradation by size and classification of risk. Trends such as increases in dividends or decreases in premiums, gradation by size and larger average size of policies, credits for female mortality, and changing rates of expense, have all been adjusting the automatic premium loan periods continuously, usually toward further extension. A sample comparison of extended insurance and A.P.L. periods shows that extended term is significantly greater for terms up to age 50, and that grading of premium by size has an important effect on the A.P.L. (see accompanying table).

CANADA LIFE—PARTICIPATING LIFE PAID-UP AT 90—UNITED STATES

AGE AT ISSUE	PREMIUMS CEASE AT END OF YEAR	EXTENDED INSURANCE—YEARS			AUTOMATIC LOAN—YEARS	
		1941 CSO 2½%	1958 CSO 2½%	CET 2½%	Amount $1,000	Amount $25,000
25.....	5	13.1	19.3	16.2	7.0	11.5
25.....	10	20.1	25.6	22.3	13.6	19.3
45.....	5	7.1	9.3	7.6	6.3	8.1
45.....	10	10.6	12.8	10.6	11.3	13.3

Important advantages of A.P.L. method are the prevention of sudden termination of supplemental benefits and the reinstatement of the policy without evidence of insurability. On extended term, however, most benefits are cancelled and the chance of policyholder misunderstanding and dissatisfaction is greater if the change occurs after some arbitrary period rather than at the time of nonpayment of premiums.

I conclude that the contemplated type of change is neither necessary nor desirable.

MR. WILLARD A. THOMPSON: The New York Life believes that it is in the best interest of both the company and its policyowners to limit the number of consecutive premiums which can be paid by A.P.L. An A.P.L. provision is primarily intended to prevent inadvertent lapse. An unlimited A.P.L. provision is disadvantageous to the company because of the exceedingly high administrative expenses and the lack of incentive for the agent to attempt to persuade the policyowner to resume premium payments. It is also generally unfavorable to the policyowner who has no intention of resuming premium payments.

In 1954, our A.P.L. provision in new policies was limited to the payment of only two consecutive premiums, with the payment of a premium, either in cash or by policy loan, making the provision again available for the payment of future premiums. This limitation gives time for the company to notify the policyowner of the situation, for the policyowner to resume premium payments without furnishing evidence of insurability and for the agent to attempt to conserve the policy.

A study based on more than 4,000 policies issued in 1954 showed that A.P.L.'s were made on about 10% of annual, 13% of semiannual, 18% of quarterly and 23% of monthly premium policies.

This study and the feelings of our marketing people led us to conclude that the provision helps to conserve business and the limitation is quite satisfactory with a few exceptions.

MR. ANDREW C. WEBSTER: In the Mutual of New York policies the A.P.L. clause operates for only one premium. If a second premium is unpaid the policy goes on extended insurance. This avoids the piling up of a debt by the continued use of the A.P.L. clause with eventual lapse of the policy, and still protects the insured against a casual lapse.

MR. L. G. CURRENT: As about 8½% of the ordinary premium income of the Mutual Life of Canada arises from A.P.L.'s, service and equity to the policyholder must not be at the expense of out-of-line maintenance cost. If three successive monthly premiums are advanced under A.P.L., we change the premium frequency to yearly, and a study of some cases showed that a number would run a year or two longer on this basis than if the extended term option had been selected.

If the extended term option is automatic, selection is not very important and even less so if the option were automatic after a limited number of premiums had been paid by premium loan. Moreover, if it is not necessary to have tables of extended term periods in the contract, a current mortality table and interest rate could be used. A test of extended term and A.P.L. periods on A24–29 2½%, 1958 CSO 2½% and CET 2½% confirmed Mr. Maynard's findings. Under the A.P.L. option, however, the protection is reduced by the loan and at some point the cost of processing A.P.L.'s surpasses the cost of a change to extended insurance.

An analysis of 700 recent premium loans showed 55% of those with A.P.L. for 5 years or less and 47% of those with A.P.L. for 6 to 10 years were making some repayments. Of those with no repayment, 45% were in the first 3 years.

If premiums are advanced under A.P.L. for 5 years after the time of default and then the policy is changed to extended insurance, the policyholder will receive protection for a maximum period, exceeding the extended term period available at the time of default. However, no automatic procedure should replace the personal contact of the agent or branch secretary at the time of default.

Los Angeles Regional Meeting

MR. CHARLES MEHLMAN: I would like to comment in the beginning that my remarks are personal opinion and that they do not necessarily reflect the views of the California Department of Insurance.

If an insurer decides to refund premiums paid beyond the date of death on life insurance policies, the logical basis for net premiums and reserves would appear to be continuous functions. There may be a competitive aspect in adopting such a basis, as it generally results in slightly higher cash values which would have an effect on the usual net cost projections.

Changing to an age last birthday basis for premium rates, nonforfeiture values and reserves appears to be merely an agency question. Both the age nearest birthday and age last birthday bases have adequate actuarial justification. Sales psychology suggests the desirability of making this change at a time when all actuarial values are being recalculated concurrent with the changeover to the 1958 CSO Table. Within a few years it is possible that an age last birthday basis will be considered a more modern method of merchandising. It certainly coincides with the average individual's concept of his actual age.

One competitive aspect is the effect on net cost projections as commonly used in agency presentations. The age content for a company using the age last birthday basis is one-half year higher on the average than under the age nearest birthday basis. This complicates comparisons between companies and could present another item requiring full disclosure in connection with so-called "twisting cases."

I feel that the common practice of high first year commissions and low renewals suggests the use of CRVM reserves as being more realistic. It appears that any trend otherwise is generated largely from tax aspects of the recently enacted federal income tax laws.

I think the effect on public relations is a primary consideration in deciding whether to limit the number of consecutive premiums that may be paid by automatic premium loan. I believe before adopting such a plan a company should compare the magnitude of the insurance benefits between a plan which allows premiums to be paid by automatic premium loan as long as the loan value permits and a plan which automatically limits the number of premiums that may be paid by automatic loan. The magnitude of the insurance benefit might be considered to be the actuarial net single premium for the decreasing term insurance under the one plan and the combination of decreasing term and level insurance under the other.

If (*a*) the insurance benefit is generally greater under the plan limiting automatic payment by policy loan and (*b*) experience indicates that resumption of premium payments seldom occurs after the critical number of automatic premium loans has been made, the loss of the right to resume cash premium payment without presenting evidence of insurability may be relatively unimportant. Furthermore, for an insurer, the smaller expense margins under a plan limiting automatic premium payments may be more than offset by the savings in administrative expense as compared with the plan where the automatic premium loans are continued as long as policy values permit.

The high administrative expenses under a system permitting premium

loans to be made as long as policy values permit hardly produces anything of value for a policyholder and there may be further dilution of policy values arising from the excess of the policy loan interest rate over the reserve rate. I wonder if it might not be desirable to minimize administrative expenses by limiting the number of consecutive premiums that may be paid by automatic loan and thus provide the policyholder with a larger insurance benefit after default in cash premium payment occurs.

MR. LOUIS GARFIN: I would like to discuss some of the considerations involved in the use of continuous functions. Continuous functions are based on the assumptions that premiums are payable continuously and that death claims are payable immediately. Since as a practical matter claims are paid immediately, this assumption is not an important item to consider in deciding whether to adopt continuous functions.

However, the assumption that premiums are payable continuously implies that they will not be paid beyond the date of death. Since premiums as a practical matter cannot be paid continuously, this means that a company must decide whether to refund premiums paid beyond the date of death. The pressure for refunding premiums paid beyond the date of death comes primarily from our agency forces.

I feel that this benefit is not very important competitively at the time of issue. However, a company, and particularly its field representatives, often find it to be very difficult to explain to a beneficiary why they did not refund premiums paid beyond the date of death when another company did. Thus, the public relations factor is an important consideration in the determination of whether to adopt continuous functions. If you adopt continuous functions for new business only, you may then be faced with the problem of explaining why premiums are not refunded on old policies.

I recommend the Actuarial Note by John M. Boermeester in the May 1949 *Transactions* of the Actuarial Society of America for those interested in the technical aspects of continuous premiums assumptions. Mr. Boermeester discussed the proper premium charge, the amount of refund at death and the cost of insurance in his paper.

Other factors to consider in the adoption of continuous functions are the effect on premiums, cash values, dividends and annual statement reserves. This is one way to beef up cash values. The level of reserves is important for two reasons: (1) the effect on a company's federal income tax and (2) the strain on surplus because of the larger increment to the reserves on new business. The adoption of continuous functions may also give rise to some administrative problems, such as training people to work

with the new functions and the rewriting of programs for an electronic data processing system.

I believe there may be other approaches to accomplish essentially the same results as adopting continuous functions but which will not introduce so many complications. For example, one possibility is to use curtate functions adapted for immediate payment of claims and to solve the premium refund problem by the use of apportionable premiums.

MR. MENO T. LAKE: The principal effects of adopting continuous functions would appear to be a slight increase in premiums, cash values and the cost of death claims. A company will need to decide whether the competitive advantages of higher policy benefits will justify the competitive disadvantage of charging higher premiums.

In addition to competitive considerations there are others that may be important, such as the availability of the basic values, premiums, and reserves for the plans involved, the administrative complications created by having business in force under two different bases and the effect on public relations of refunding unearned premiums on some policies but not on others. If a company decides to refund unearned premiums at death on new policies, they will probably want to consider whether the effect on public relations would justify the higher claim costs of also refunding unearned premiums at death on existing business.

An important consideration in deciding whether to adopt age last birthday for premiums is the availability of the necessary basic monetary values. Other effects of going to age last birthday that should be taken into consideration are:

1. For a stock company the effect on premium rates, particularly term rates.
2. The effect on the agency force and the insuring public because of the disruption that is bound to occur when the change is made.
3. The problem of competing with those companies still publishing rates for age nearest birthday.

In summary, the final decision as to whether or not to change to age last birthday would depend on whether or not its appeal to the buying public would justify the additional expense and problems caused by making the change.

The primary considerations involved in changing from a modified reserve basis to a net level reserve basis are the drain on surplus from new business and the effect on its federal income tax. Unless a company is planning to go to net level premium reserves on both its existing and new business, it should consider the possibility of using available surplus to strengthen old business to net level and keeping new business on Com-

missioners Reserves. Then, by the use of the preliminary term election provision under the tax law for new business, a company may be able to minimize its tax.

A company would also need to consider the competitive aspects of changing the reserve basis for new business. The use of Commissioners Reserves gives rise to lower cash values, but this would in turn permit lower premiums. The final decision will probably be considerably influenced by the level of cash values desired by the management of a company. I believe that only a fairly large company would need to seriously consider putting all of its new business on the net level premium reserve basis.

We believe there are several reasons a company doing business in both the United States and Canada may want to adopt the 1958 CSO Table for Canadian business even though it is not required. They are: maintaining internal consistency between the business in the two countries, the fact that some states will require revaluation of the Canadian business anyway, and the reduction in deficiency reserves now held by many stock companies on Canadian business based on the 1941 CSO Table.

I believe there may be some merit in not permitting an automatic premium loan provision to use up the entire value of a policy. In my company a policyholder has to elect the automatic premium loan option and we feel this may indicate his desire to maintain the policy in its original form. At the very least I believe we would have to notify him before making the extended term option operative.

From the policyholder's standpoint I would think the best system would be one in which the company would write a letter after several premiums have been paid by policy loans and ask him if he wants to continue paying premiums in this manner or place the policy under the extended term option. Such a system obviously has its administrative problems, one of which would be the problem of explaining the two options clearly to the policyholder.

MR. ALAN RICHARDS: The introduction by the Metropolitan last year of Ordinary policies issued on the basis of age last birthday appears to have aroused considerable interest within the industry. A few companies have already used the conversion to the 1958 CSO Table as an opportunity to switch from an age nearest birthday to an age last birthday basis. Many more would probably follow suit but perhaps are deterred by the lack of extensive published monetary tables.

There do not appear to be any serious regulatory problems. Presumably, any company adopting age last birthday will use the interpolated l_x and d_x columns (but not the derived values of $1{,}000q_x$ to two decimal

places) printed in the back of the basic value tables published by the Society for 1958 CSO and CET, thus preserving the uniformity essential to general recognition of the method.

There are some interesting competitive aspects of the use of age last birthday, particularly for a company which has a large amount of brokerage business. Such a company switching to this basis in the near future may find that while its manual rates are apparently slightly higher for a given tabular age, it may attract considerable amounts of business concentrated in the last half of the year of age.

It is probable that the use of age last birthday will ultimately become general usage. Under those circumstances the few remaining companies which do not switch will probably find that they are attracting considerable amounts of brokerage business concentrated in the first half of the year of age.

MR. CHRISTOPHER H. WAIN: A change in reserve basis does not affect the aggregate amount of reserves and surplus required to mature safely a company's business. Generally speaking, for tax purposes it is desirable to provide reserves rather than earmark surplus for any amount of liability that a company has assumed. This principle affects decisions on both the use of continuous functions and the type of reserve basis to be adopted.

We can consider continuous functions as primarily reflecting the immediate payment of death claims and the return of unearned premium in the year of death. Since most companies pay death claims immediately anyway, it is desirable to establish the appropriate reserve. The return of unearned premiums at death is a benefit many companies do not provide. Allowing it would obviously narrow the difference between annual and monthly premiums. This might further encourage the trend to monthly premium sales. However, asset share tests for annual and monthly business reflecting their different lapse rates and other features indicate existing premium differentials for monthly business are inadequate. It is also doubtful if the additional death benefit of the return of unearned premium is as desirable competitively as the lower annual premium that can be provided without this benefit.

We at Prudential have always discouraged the use of the automatic premium loan provision in our policies. We believe the extended term insurance feature does give the policyholder a better break on the whole. However, in today's market the trend is for more supplementary benefits to be attached to policies that are not subject to the extended term provisions. In view of this tendency of the basic policy to represent only a

portion of the insurance program, it may be that the advantages of the automatic premium loan provision are increasing.

MR. ALFRED L. BUCKMAN: Beneficial Standard came out with a completely revised rate book on January 1, 1961, based on the 1958 CSO Table. In developing the rates for this new rate book we had to take into consideration all of the questions in section A. Our decisions were influenced in large measure by the availability of certain materials.

We studied the possibility of adopting continuous functions as a basis, but we finally decided to use discrete functions because of our peculiar practice of having two types of death benefits differing between those persons who pay the regular installment premiums shown in our rate book and those who pay reduced installment premiums (those who pay on government allotment basis or those who pay by pre-authorized check plan.)

Where we do not get sufficient loading in our installment premiums to include also the extra insurance benefit involved in not deducting the balance of the annual premium, we do deduct the balance of the annual premium on death. Where we get sufficient margin in our regular monthly or quarterly or semiannual loading, we do not deduct the balance of the annual premium.

Age last birthday was appealing to some of our agency people and to some of our top management. However, we decided against it because we did not have available in time the necessary tables. I argued against age last birthday and won the argument primarily because the tables were not available.

I would like to tell you why I argued against adopting age last birthday as a basis for our new rate book. There are now in force in the United States over 100,000,000 Ordinary policies based on age nearest birthday and 100,000,000 Industrial policies based on age next birthday. If we now go into age last birthday, our policyholders will not have any idea what age they are talking about when discussing their insurance policies. Also, there really is no competitive advantage to an age last birthday basis over an age nearest birthday basis because each will have an advantage for six months of each year between birthdays.

So far as changing reserve methods for reserves, it is all a question of management. Does management want to have a place to hide surplus, or does it have to have more surplus? Logically the CRV reserves fit asset shares of a company as they are developed and I think that most companies are well advised to continue using the CRV basis for reserves rather than to go to net level premium reserves. However, companies with surplus to hide will most likely go on a net level basis for reserves.