

**DISCUSSION OF PAPERS PRESENTED AT THE
SPRING MEETINGS
ACTUARIAL ASPECTS OF THE RAILROAD RETIREMENT
SYSTEM**

JOSEPH MUSER

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ROBERT J. MYERS:

Mr. Musher's paper represents an important step in filling out the actuarial literature on pension plans. Although the Railroad Retirement program has certain aspects of social insurance, nevertheless it may well be considered as being a very large pension plan; in fact, from an actuarial viewpoint any social insurance system may likewise be so considered.

The paper sets down in very detailed fashion how the valuation has been made, taking into account the various complexities of the law and the limitations of the available data. This in itself is a very worth-while feature because too often the student may consider only a simple plan, with all necessary data being available. The approximations and assumptions necessary are well pointed out by Mr. Musher, and as to these, no doubt, individual differences of opinion would arise among different actuaries.

For one thing, should not some allowance for improving mortality in the future be incorporated? The mortality basis has been strengthened from the previous valuation by a 1-year rate-back, but perhaps further mortality conservatism should be incorporated.

As is generally the case in the valuation of pension plans, Mr. Musher has made only a single valuation based on a single set of assumptions although he well recognizes in his concluding paragraph that a wide range of variation is possible. In my opinion, alternative valuations on the basis of reasonable assumptions are highly desirable and might well be very informative, from both actuarial and policy standpoints.

For instance, one very important assumption which might be open to question is that there will be a more or less stable payroll into the future, which can be translated into an equivalent level payroll. In a pension plan involving any one company or even any one industry, there may well be some doubt as to its perpetual continuation. This seems to be especially true for the railroad industry which, it seems reasonably certain, will in the near future continue to lose a large part of its passenger business.

The cost of the system on any assumption such as a declining employment base would quite obviously be much higher and might eventually present a very serious problem. It should be emphasized that this difficulty cannot be solved by the "increasing wage theory" because as wages go up so, too, will prices; hence benefit levels correspondingly need to be adjusted upward so that the relative payroll base will in any event decline.

Further, I believe that while the level cost method valuation (as used here and in pension plans generally) does possess value, nevertheless the results should also be shown on a projection basis, which is much more understandable to actuaries and laymen alike. Looking at a level cost valuation, one must take much for granted, whereas in the detailed results shown in a projection type valuation the reviewer may observe and compare many important statistics, such as the proportion of people getting benefits, the average benefits, and the progress of various items over time. Moreover, level cost figures may readily be developed from the results of a projection, but the "omelet cannot be unscrambled" since it is impossible to get a projection from the results of a level cost valuation.

It is appreciated that a level cost valuation is much more susceptible to elegant mathematical treatment and presentation, as exemplified by the formulas which Mr. Musher has developed. On the other hand, a projection type valuation is very difficult to set forth on this basis. However, the reader is referred to pp. 184-266 of *Issues in Social Security* (Committee on Ways and Means, House of Representatives, January 17, 1946), where G. W. K. Grange most ably sets forth the complete calculations underlying a long-range cost estimate of the projection type for the old-age and survivors insurance program.

Finally, there may be considered the trend shown in the four valuations that have been made for the Railroad Retirement system. The net level costs thereof are as follows:

Valuation	Net Level Cost
First.....	10.80% (12/31/38)
Second.....	10.21 (12/31/41)
Third.....	8.99 (12/31/44)
Fourth.....	12.72 (12/31/47)

The first three valuations dealt with essentially the same system, and the downward trend in cost is primarily the result of the increasing payroll base (as brought out by Mr. Musher on page 44). The fourth valuation is in respect to retirement benefits which have been increased by 20% and to the newly added survivor benefits. One factor increasing the net level cost in the 9-year period is that the actual tax rate collected was well below the net level cost so that a deficiency arose on this account and thus a higher level cost is required in the future.

The question may well be raised as to how it is that benefits have been so greatly liberalized (and also taxes have been less than required on a net level basis), but yet the over-all cost has not risen greatly. The explanation which comes at first is the rise in payroll, and this is in large part due to higher wage rates. In turn this means that because of the weighted nature of the benefit formula the adequacy of the benefits has been reduced. Also, retirement benefits are based on an average wage covering the entire period of service rather than from the beginning of the system in 1937 (wages before that date are based on the average during the relatively good years, 1924-31). Thus, the inadequacy of the benefits increases as wages rise because the average wage for benefits lags considerably behind the current average wage. For instance, the average credited and taxed wage for those steadily employed (in all 12 months of the year) was about \$150 per month for 1937-40 but currently is in excess of \$250 per month. On the other hand, the average wage used for old-age retirement benefits awarded in the early years was about \$150 per month, whereas currently it is only about \$160 per month.

The average old-age retirement annuity was about \$66 per month in the early years of the program, or about 44% of the average full-time wage, a fairly generous benefit. Now, with the 20% increase under the 1948 amendments, the average annuity is about \$85, which is only about 33% of the current wage level, so that benefit adequacy has been reduced by about one-fourth relatively. To some extent this decrease in benefit adequacy has been accounted for by the addition of survivor benefits, which is a worth-while substitution from a social insurance viewpoint. However, a considerable part of the decrease in benefit adequacy represents a lowering of the cost "sights" so that what was once a more costly program has now been reduced to somewhat lower levels through the hidden method of inflation.

Putting it another way, in 1937 the Railroad Retirement program paying about \$65 per month as a retirement benefit was quite an aristocrat among private pension plans, but now—despite a 20% increase to about \$85 per month as an average—it is well below the plans of many other industrial groups which are promising \$100 a month or more as a minimum (although, it should be noted, only to those with long periods of service and in service at attainment of retirement age). However, even considering those under the Railroad Retirement program with 25 or more years of service, the *average* annuity currently being awarded is only about \$100 a month. This should be an indication of the great cost which can arise in a pension plan so that the relative benefit levels may eventually have to be lowered because of the cost element (as has already been done for Railroad Retirement). This might eventually occur in some of the other recently

inaugurated large industrial pension plans, for which the only saving feature may be that (unlike the Railroad Retirement system which has full vesting) there is not at the moment vesting of benefits—a very costly, but a very necessary feature.

JOSEPH A. CHRISTMAN:

My remarks will relate only to the total and permanent disability benefits of the Railroad Retirement system.

The disability admission data given in the paper relate chiefly to disability annuities granted in 1947 under the liberalized provisions which took effect January 1st of that year. The reduction in the service requirement has extended the coverage to such an extent that the 1947 exposures amounted to 859,000 life years, whereas the 1946 exposures were only 312,000. Of the 859,000, 75% were eligible for disability benefits in the event of disablement for the regular occupation, even though the claimant might be capable of work in a less exacting occupation. These changes in the conditions of benefit have made it necessary to calculate separate tables of disability rates as between those eligible for benefit only in the event of total disablement and those eligible for occupational disability benefits. The latter group was subdivided above age 60 into those with more than 20 years of service and those with less than 20 years of service.

In order to relate these new 1947 admission rates to the experience of the previous 10 years already published in the triennial Actuarial Reports, I have calculated expected claims by the table derived from the group life railroad experience of 1930–34. This table was the basis of the cost estimates for the 1937 Act.

For the decade 1937–46 the ratio of Actual to Expected was approximately 130%. If we exclude the experience of 1937, which was abnormally high, and that of the war period, which was abnormally low, the ratio is 164%. In comparison, the ratios for 1947 are:

For those eligible only in the event of total disability	160%
For those eligible for occupational disability	228%

Part of this difference between the occupational disability rates and the rates for total disability may be due to the larger benefits available on the average to those in the group with 20 or more years of service. This group (for ages under 60) averaged about 28 years of service, while the group eligible only in the event of total disability averaged only about 15 years of service. The benefits, of course, are proportional to years of service weighted by earnings according to a formula. Some indication that the size

of the benefit affects the disability rate appears when we compare the occupational disability rates for persons age 60-64 as between those with 20 or more years of service and those with less than 20 years of service. The rate is more than double in the group with the longer service.

It may be of interest to know how the 1947 experience compares with that under ordinary life insurance disability income benefits. I have applied the graduated rates of the 1947 experience as shown in Mr. Musher's Table 3 to Metropolitan's 1947 exposure under our total and permanent disability income benefits issued from 1923 to 1929, which provided for an immediate income of \$10 per month per thousand of insurance, plus waiver of premiums, on proof of total and permanent disability. Our coverage ceases at age 60. For ages below 60, Metropolitan actual claims were 48% of the expected by Mr. Musher's Table 3 for those with 10 to 20 years of service, and 38% of the expected by the Table for those with over 20 years of service.

The experience of 1947 does not appear to offer a reliable guide for the future. On the one hand, the admissions were swelled by a backlog of cases where the disabling condition already existed prior to 1947 but was not compensable either because of the service requirements or because occupational disability was not then recognized. Many of these people apparently had remained at work until the law was changed. On the other hand, economic conditions have been such as would produce low rates of disability retirement. Short-range future experience no doubt will be better than in 1947, but the long-range average is yet to be determined.

Not only are the 1947 admission rates of the Railroad Retirement system high as compared with individual life insurance experience, but the value of the claim annuity at disability is also high. These claim annuities are figured on a mortality table and recovery is allowed for by a 10% reduction in the cost of disability payments made prior to age 65. After applying this reduction at specific ages, the Railroad claim annuities compare with annuities deduced from Metropolitan's experience, as follows, using 3% interest:

AGE	RAILROAD ANNUITIES— $a_x^{i(12)}$ —LESS ALLOWANCE FOR RECOVERY		METROPOLITAN 1925-39 EXPERIENCE— $a_x^{i(12)}$
	Applicable to 1947 Total Disability Admissions	Applicable to 1947 Occupational Dis- ability Admissions	
43.....	\$10.11	\$11.36	\$6.62
53.....	7.99	8.85	6.15

The paper does not give any statistical basis for the 10% reduction in the temporary annuity to allow for recovery. Recoveries under the 1937 Act have been negligible, and even under the amended provision the recovery rate in the twelve months ending June 1949 was only 1.1% per year.

The disability admission experience tables reflect exposures and claims among "active" employees only (that is, at work in current or preceding year). In the past it has been assumed in the cost calculations that any disability claims arising from workers who had left employment had a negligible effect, since in general they could only obtain a disability annuity beginning at age 60, and then only on a reduced basis. It may be that with the elimination of this reduction and the lower service requirement, disability claims arising from the inactive employees will have to be taken account of in the cost calculations. Such claims in the past have been quite numerous, amounting to almost 15% as many as the number arising among "active" employees.

When the 1947 Amendments were before Congress, Mr. Murray Latimer estimated that the changes in the disability provisions would cost .85% of payroll. It would be of interest if Mr. Musher could tell us how actual 1947 experience compared with the assumptions underlying that estimate.

A. M. NIESSEN:

Mr. Musher's paper describes the valuation techniques applicable to the railroad retirement system and presents the results of the over-all cost estimates arrived at in the course of the Railroad Retirement Board's latest valuation. In connection with these cost calculations, it may be of interest to discuss also the results of two supplementary studies, one of which deals with prior service and the other with a breakdown of the total gross cost figures according to the type of benefit.

1. *Prior Service*

The term prior service as used in the Railroad Retirement Board refers to creditable service performed before 1937. The criterion for the creditability of such service is that the individual should have been connected with the railroad industry on August 29, 1935, which is the enactment date of the first valid Railroad Retirement Act. As of the end of 1947, there were 1,203,000 former or present employees who had prior-service credits. Of this number, 762,000 were active employees (in the sense used in the valuation), 221,000 were inactive, and 220,000 were retired. It is interesting to note that the 220,000 retired employees with prior service constituted over 99% of all retired employees on the rolls.

The total prior-service liability on the date of the valuation was \$3.6 billion, which is 34.4% of the total liability on account of retirement benefits. When retired employees alone are considered, we find that the liability with respect to their prior service was over \$1.4 billion, which is almost 84% of the corresponding total present value of \$1.7 billion.

The prior-service liability, when related to an equivalent level payroll of \$4.6 billion, amounts to 2.31% of such payroll. Thus, if the question of the origin of reserves is disregarded, it can be said that of the total tax rate of 12.72 percentage units arrived at in the valuation, 2.31 units or 18% of the total is attributable to prior service.

2. Breakdown of Costs

Mr. Musher shows a total gross level cost figure of 13.36% of payroll. When credit is taken for funds on hand and charges are added for administrative expenses, the figure comes down to a net of 12.72%. In order to bring out the various components which combine to make up the total gross cost of 13.36% of payroll, I am presenting below a table which shows the breakdown of costs according to the type of benefit. While this table is believed to be self-explanatory, several comments may be in order. Some of the comments are made mainly for the convenience of the reader who would otherwise have to refer back to Mr. Musher's paper for a definition of terms. The comments follow:

(a) Deferred age annuities refer to permanent withdrawals who retain the right to annuities based on their creditable service performed before the date of separation. It can be seen that such deferred annuities account for a significant portion (23%) of the total cost of retirement benefits.

(b) Immediate disability annuities payable before age 65 refer to annuities payable from the date of accrual to the date on which the disability annuitant reaches the age of 65. The remaining portion of the life annuities to these individuals is not a result of the disability provisions of the Railroad Retirement Act, since annuities at age 65 and over are available to all employees. In consequence, the cost due to the disability feature is only 1.38% of payroll, although the cost of the life annuities payable to disabled employees is shown as 2.70%.

(c) Pensions refer to annuities payable to railroad employees who retired under the provisions of the former private pension plans which were in existence before the enactment of the Railroad Retirement Act of 1937.

(d) Survivor annuities under old options are annuities to widows of deceased annuitants who elected joint and survivor options. New elections of such options are not permitted under the present Railroad Retirement

Act as amended in 1946. Survivor annuities under the old options have no effect on the amount of widows' insurance annuities payable in accordance with the present law.

(e) Cost figures for survivor insurance benefits shown as 2.256% of payroll are not directly comparable with similar figures for the present Social Security Act. There are several reasons for the differences in the size of the over-all cost of survivor benefits as well as in the distribution of costs by type of benefit. One of the reasons which is certainly worth mentioning is the difference in the sex composition of the coverage under the Railroad Retirement Act on the one hand, and under the Social Security Act on the other.

(f) Residual payments refer to the final lump-sum settlement which is payable only in cases where the total of retirement and regular survivor benefits is less than the minimum return guaranteed by the Railroad Retirement Act. This minimum return equals 4% of the total taxable compensation before 1947 and 7% of such compensation after 1946.

**BREAKDOWN OF GROSS LEVEL COSTS DERIVED IN THE
FOURTH VALUATION***

Class of Benefit	Gross Costs As a Percentage of Future Taxable Payrolls	
1. Age annuities		
a. Immediate.....	5.180%	
b. Deferred.....	2.379	7.559%
2. Immediate disability annuities		
a. Payable before age 65.....	1.382%	
b. Payable after age 65.....	1.320	2.702
3. Pensions		
a. Nondisability.....	.010%	
b. Disability.....	.019	.029
4. Survivor annuities under old options.		.017 10.307%
5. Survivor insurance benefits		
a. Annuities to aged widows.....	1.581%	
b. Annuities to widowed mothers....	.165	
c. Annuities to children.....	.280	
d. Annuities to parents.....	.051	
e. Insurance lump sums.....	.179	2.256%
6. Residual payments.....		.798 3.054

* Figures refer to costs as of December 31, 1947, without regard to funds on hand and do not include administrative expenses. Benefits were computed in accordance with the amendments of June 23, 1948.

(AUTHOR'S REVIEW OF DISCUSSION)

JOSEPH MUSER:

Before reviewing the discussions, I should like to thank Messrs. Myers, Christman, and Niessen for their written presentations. I believe their remarks add much that is of interest and usefulness to the paper itself.

Mr. Myers asks whether some allowance for improving mortality in the future should not have been incorporated in our latest valuation. I am inclined to believe that provision for such improvement, if substantial, would have to be considered in conjunction with the effect on retirement rates. Possibly it should be iterated, in this connection, that the most recent valuation includes a hedge against future mortality improvements in so far as it has not taken cognizance of the continued low retirement rates actually experienced not only during the war years but during the postwar period as well. Second, the period between valuations is relatively short, so that opportunities present themselves periodically for reorienting our notions not only with respect to mortality rates but also with reference to all the other basic factors which go into a valuation. Further, it is questionable whether the same degree of conservatism is in order for a governmental system of benefits and all that it implies, as compared with a private plan in which profits and losses play a major if not decisive role.

Mr. Myers also feels that in view of the wide range of variation which is possible under a system like that administered by the Railroad Retirement Board, it would be desirable to run alternative valuations, presumably on a "reasonably high" and "reasonably low" set of cost assumptions. If such alternative valuations are to be used as supplements to the main valuation in order to get an idea of the ends of the range, I would be inclined to go along. In fact, such procedure was actually adopted by the author for the third valuation of the assets and liabilities of the railroad retirement system. On the other hand, if Mr. Myers means to supersede the main valuation based on a single set of assumptions we would part company at that particular point.

While it is important to have some measure of the extent of the range within which true costs lie, it is my opinion that the actuary accomplishes more in guiding policy by arriving at his own best notion of a cost figure than by leaving it to the layman to steer the cost ship between the courses of "low" and "high" reference. Nevertheless, to balance this point of view, the author suggests Mr. Myers' paper, "Some Considerations in Pension Fund Valuation" (*TASA XLVI*, 51), to the interested reader.

Like Mr. Myers, we at the Railroad Retirement Board have believed

that some provision must be made for a declining employment base in valuing costs under the railroad retirement system. We differ as to the course and rapidity of such decline. Further, we do not share his lugubrious feelings about the imminent severe decline or even the eventual disappearance of the railroads as a basic means of transporting the goods and persons of the nation.

We agree with Mr. Myers as to the importance of a projection. It has served as a valuable supplement in connection with our own valuations and has been the basic tool for alternative cost analyses under the old-age and survivors insurance program for social security. The difficulty inherent in the "alternative projections," however, is that they can only be looked upon as low and high cost "illustrations." Yet, unless the actuary himself leads the way, the level cost "omelets" derived from the alternative high and low cost projections will be averaged to obtain a more palatable single cost figure which is suitable to the public's financial taste.

Mr. Myers makes some very interesting observations relative to the declining ratio, since the beginning of the retirement system, of the average benefit in force to the current wage. As he points out, the explanation lies in the fact that the railroad retirement benefit is tied, not to earnings in a final period before retirement, but rather to an average wage spread over the entire period of service. He then goes on to make a comparison with the plans of other industrial groups—one in which the railroad retirement program appears to come out second best. It should be pointed out, however, that the industrial plans Mr. Myers makes reference to require a continuity of service until retirement age. No vesting or transferring of rights exists for the individual who leaves employment before retirement or who transfers from one employer to another—even within the same industry. Such situation is in sharp contrast with the railroad retirement system, wherein service remains creditable regardless of continuity of employment and regardless of the shifts in employment from one railroad carrier to another.

Mr. Niessen, in his discussion, brings out in further detail the cost figures presented in the paper for the fourth valuation of the railroad retirement system. In this connection, he points out that as of the end of 1947 there were 1.2 million former or present employees who had credits for service rendered before 1937 (before which time taxes were not collected). He notes further that the total prior service liability for such creditable service was \$3.6 billion and required, in effect, a servicing charge equal to 2.31 percent of the annual payroll.

The following pertinent facts are of interest with reference to the table Mr. Niessen presents.

1. Deferred annuities arising under the Act represent almost one-quarter of the total retirement load.
2. The value of disability benefit payments made before the disabled annuitant reaches age 65 represents somewhat more than 50 percent of the total cost for individuals retiring under the disability provisions of the Railroad Retirement Act. Note that the benefits payable to such individuals after age 65 would have arisen in any event even if there were no disability provisions.
3. When considering the survivor insurance benefits, the costs for aged widows comprise 70 percent of the total. As indicated by Mr. Niessen, the distribution of the survivor insurance costs is somewhat different from those resulting from cost analyses made by Mr. Myers for the social security system—although, of course, the aged widows' benefits comprise the major portion of the insurance costs under both systems.
4. The guarantee that the total of benefits shall not be less, in any instance, than 4 percent of the employee's total taxable compensation before 1947 and 7 percent of such compensation after 1946 is somewhat more costly than would appear at first view. This guarantee adds as much as .8 percent of payroll to the over-all cost of the system.

Mr. Christman's remarks have been solely addressed to the total and permanent disability features of the railroad retirement system. He first points out that the reduction in the service requirements introduced by the 1946 amendments to the Act extended the coverage to such an extent that the exposures in 1947 amounted to 859,000 life years as compared with 312,000 for 1946. Of related interest is the fact that exposures at ages 60-64 (in which age group no service requirement for eligibility had ever been necessary) were 161,000 in 1946 and 156,000 in 1947.

Mr. Christman then proceeds to obtain an index of railroad retirement disability experience for the decade 1937-46. As a standard of measurement for such purpose, he uses a table based on group-life railroad disability experience in 1930-34. (For lack of actual disability retirement experience, this table was originally used in cost estimates prepared prior to the passage of the 1937 Railroad Retirement Act.) In an apparent attempt to reflect such disability experience under normal conditions, he excludes the experience of 1937 as being abnormally high and that of the war period as being abnormally low. A net over-all ratio of 164 percent emerges.

In support of this approximation to a disability retirement norm, Mr. Christman could well point to the practices followed in the second and third valuations of the railroad retirement system. Mr. Myers in the sec-

ond and the author in the third valuations reached the same conclusion that the 1938-41 experience would be the most reliable base upon which to build the tabular disability retirement rates of the respective valuations. However, this author now feels in retrospect that a better approximation to a normal disability retirement picture under permanent and total disability for the railroad retirement system would have been obtained if the experience base were switched to the period 1939-41.

The following considerations have influenced my change in point of view. First, the year 1938 witnessed a sharp business recession and undoubtedly still contained a substantial backlog of disability awards with respect to individuals who postponed their retirement until it was clear that the constitutionality of the 1937 Railroad Retirement Act would no longer be questioned. It is difficult, of course, to properly weigh the relative influence of these two factors on actual experience in 1938. But the fact remains that the actual to expected ratio of disability retirements in that year, according to the 1930-34 standard applied by Mr. Christman, was even higher than for 1937. Second, actual disability experience since 1941 does not appear to support the notions which Mr. Christman has, and which the author originally shared, with respect to the "favorable" 1941 experience. While the far lower disability rates evidenced in 1942-44 could be written off because of the patriotic desires of men to remain on the job in an emergency which taxed the total national effort, the continued relatively low disability rates of 1945 and 1946 suggest that a change in our notions as to typical long term permanent and total disability trends might be in order. It should be noted in this connection that for 1945 (approximately half of which was during the war and the other half of which was postwar) the actual to expected ratio by the 1930-34 standard was under 100 percent. And even in 1946, which must have undoubtedly contained a backlog of disabilities which occurred during the active war period, the ratio was less than 120 percent.

In view of the foregoing, I am now inclined to believe that Mr. Christman's original over-all ratio for the decade (130 percent) represents a closer approximation to normalcy under the permanent and total disability retirement provisions than the 164 percent ratio which he later derives.

The sharp rise in the ratio for 1947 as compared with 1946—under the more restrictive definition of disability—stems almost entirely from the lowering of the service bars beginning in 1947. A temporary rise would naturally be expected because of a backlog of disability cases not previously eligible for benefits prior to age 60. The correspondingly high actual to expected ratios for "occupational disability" also reflect a heavy

initial load in view of the inclusion among eligibles of individuals solely disabled for their regular occupations. The fourth valuation used the experience for 1947, first because no other pertinent data were available, and second because it seemed to provide a substantial element of conservatism pending the gathering and analysis of actual experience in future years.

Using the tabular rates of the fourth valuation as a standard, Mr. Christman then produces actual to "expected" ratios of less than 50 percent with respect to 1947 permanent and total disability exposures under Metropolitan policies issued in 1923-29. While the resulting ratios of actual to expected may be of "interest," it is highly questionable whether they are of any particular pertinence. It should be recognized, in this connection, that a very substantial portion of railroad retirement coverage involves occupational hazards of the type which would have precluded issuance of the disability income feature under ordinary life insurance contracts—notwithstanding the very liberal underwriting practices followed during the twenties. Further, while it is possible to pick and choose under a private life insurance contract, no "initial selection" of risks exists with respect to the disability provisions of the Railroad Retirement Act.

One other point. As I indicated previously, the tabular disability-retirement rates used for the fourth valuation—as shown in Table 3 of my paper—probably contain a substantial margin of conservatism. This fact, as well as the others noted immediately above, should be kept in mind; otherwise one might easily jump to the conclusion that the low ratios of actual Metropolitan claims to the "expected" by the tabular rates of the fourth valuation of the railroad retirement system serve as corroborative evidence of the laxity of a government agency in handling disability claims.

Mr. Christman then goes on to compare railroad claim annuities with those deduced from the Metropolitan experience at 3 percent. As expected, ours are substantially higher than for the Metropolitan experience. The all-important decrement involved in our annuity values is death, in contrast with the Metropolitan figures which reflect a heavy termination rate on account of recovery during the first couple of years.

We provided for a 10-percent savings in the gross cost of our disability payments prior to age 65 for the fourth valuation. This allowance was not considered other than moderate, mainly because of the amended disability provision of the Railroad Retirement Act which deems an employee to have recovered from disability at the end of a six months' period in each month of which there were earnings for hire or self-employment of \$75. Further savings have also evidenced themselves with respect to individ-

uals who returned to employer service. In such instances the annuity is immediately suspended for each such month of service and the determination of whether the annuitant has recovered from disability is not made until employer service has ceased. The latter cases were not included in the recovery rate figure of 1.1 percent per year which Mr. Christman quotes for the period July 1948-49.

Mr. Christman raises the additional point that it might be necessary to make direct provision in the actuarial calculations for individuals who have left employment and become disabled before age 60, at which latter time an annuity would be available under the amended Act on a full basis. I agree that the continuation of the method hitherto used of including such cases with healthy life withdrawals might have possibly tended to underestimate the over-all costs to some degree. As an offsetting factor, however, it should be recognized that we used lower mortality rates for such disability withdrawals (healthy life mortality rates) than would have been applied if direct provision had been made for disability benefits beginning after age 60.

As to the question raised regarding the bases underlying the estimate of the cost of the 1946 changes in the disability provisions of the Railroad Retirement Act, it was assumed that the disability rates of the third valuation would apply for eligibles with 10-20 years of service and under age 60. For individuals with 20 or more years of service or over age 60 the assumption was that, in view of the broadened definition of disability applicable in such instances, 150 percent of the third valuation rates was justified.