

Royal Canadian Mounted Police Superannuation Act

Report on Actuarial Examination  
of the  
Royal Canadian Mounted Police Superannuation Account  
in the Consolidated Revenue Fund  
as at December 31, 1959

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The Royal Canadian Mounted Police Superannuation Act, hereafter referred to as the "new Act" where it appears necessary, was assented to on July 8, 1959, and proclaimed in force on April 1, 1960. In most respects the provisions of the new Act continued the provisions of Parts V and VI of the Royal Canadian Mounted Police Act, Chapter 241 of the Revised Statutes of Canada, 1952, hereafter referred to as the "former Act." The benefits and contributions taken into account in the valuation on which this report is based are those provided for under the new Act and the pertinent regulations.

The Royal Canadian Mounted Police Pension Account, established pursuant to Part V of the former Act, is continued by the new Act under the name of the Royal Canadian Mounted Police Superannuation Account, hereafter referred to as "the Account."

Terms of the Superannuation Plan

Membership:

Persons covered by this plan comprise

- (a) members of the Royal Canadian Mounted Police, hereafter referred to as "the Force," who
  - (i) were contributors under Part V of the former Act immediately before the date on which the new Act came into force,
  - (ii) not having been members of the Force at the date on which the new Act came into force, became members of the Force subsequent to that date,
  - (iii) having been members of the Force at the date on which the new Act came into force, thereafter ceased to be members and subsequently were re-appointed to or re-enlisted in the Force, and
  - (iv) having been members of the Force but not contributors under Part V of the former Act at the date on which the new Act came into force, elected to become contributors under the new Act within one year from that date;
- (b) former members of the Force who are entitled to annuities or annual allowances payable out of the Account; and
- (c) widows and children who are in receipt of annual allowances payable out of the Account as dependants of contributors who died either in service or while entitled to an annuity or annual allowance.

Service in the Force:

Except in the case of compulsory retirement because of disability, a contributor cannot become entitled to an annuity or annual allowance when he ceases to be a member of the Force unless he has to his credit at least ten years of "service in the Force."

For purposes of the plan, "service in the Force" includes any period of service as a special constable of the Force before the date on which the new Act came into force and any period of service as a member of a provincial or municipal police force that has been taken over by the Force.

Pensionable Service:

The amount of any annuity, annual allowance or cash termination allowance to which a contributor or his dependants may become entitled under the Act depends upon the number of years of "pensionable service" to the credit of the contributor at the date he ceases to be a member of the Force.

"Pensionable service" is described in detail in the Act. In general, the pensionable service of a contributor includes any period of service in the Force for which he has contributed or has elected to contribute. It may also include

- (a) a period of service as a member of a provincial or municipal police force that has been taken over by the Force,
- (b) a period of service
  - (i) on active service in the forces during World War I or World War II,
  - (ii) in the Canadian Army Special Force established in 1950,
  - (iii) in the regular forces,
  - (iv) in forces raised by Canada other than the regular forces, provided that such service was full-time service lasting for six months or more, and
- (c) a period of full-time, paid employment in the Public Service.

enefits:

The benefit provisions of the new Act are summarized below:

Summary of Benefits

I. Contributors who are members of the Force:

<u>Type of Termination</u>	<u>Period of Service (Note 1)</u>	
	<u>Under 10 years</u>	<u>10 years or over</u>
Retirement because of age (Note 2).	Return of contributions (Note 3), or cash termination allowance (Note 4), whichever is the greater.	Immediate annuity (Note 5).
Compulsory retirement because of disability.	Return of contributions, or cash termination allowance, whichever is the greater.	Immediate annuity.
Compulsory retirement to promote economy or efficiency in the Force.	Return of contributions.	1. With 10 to 20 years, at option of contributor - (a) return of contributions, (b) deferred annuity (Note 6), or (c) reduced immediate annuity (Note 7).  2. With 20 or more years - immediate annuity.
Compulsory retirement because of misconduct (Note 8).	Return of contributions, or cash termination allowance.	(a) Return of contributions, or (b) in the discretion of the Treasury Board, (i) if the contributor has reached retirement age - immediate annuity, (ii) if the contributor has not reached retirement age - deferred annuity, reduced immediate annuity, or immediate annuity.
Voluntary retirement - contributors other than officers.	Return of contributions.	1. With 10 to 20 years, at option of contributor - (a) return of contributions, or (b) deferred annuity.  2. With 20 to 25 years - annual allowance (Note 9).  3. With 25 or more years - immediate annuity.

<u>Type of Termination</u>	<u>Period of Service (Note 1).</u>	
	<u>Under 10 years</u>	<u>10 years or over</u>
Voluntary retirement - officer contributors.	Return of contributions.	1. With 10 to 20 years - return of contributions. 2. With 20 to 35 years, at option of contributor - (a) return of contributions, (b) deferred annuity, or (c) annual allowance (Note 10). 3. With 35 or more years - immediate annuity.
Death leaving no widow or children under age 18.	Return of contributions	Return of contributions.
Death leaving widow and/or children under age 18.	Return of contributions, or cash termination allowance, whichever is the greater.	Annual allowance to widow and/or children (Notes 11 and 12).

II. Contributors entitled to annuities or annual allowances:

<u>Type of Termination</u>	<u>Benefit</u>
Death leaving no widow or children under age 18.	Return of excess contributions to estate (Note 12).
Death leaving widow and/or children under age 18.	Annual allowance to widow and/or children (Notes 12 and 13).

Note 1: "Service" for the purpose of determining the type of benefit available to a contributor or his dependants means

- (a) in the case either of compulsory retirement because of disability or of death leaving dependants, the "pensionable service" to the credit of the contributor at the date of his retirement or death, and
- (b) in all other cases, the "service in the Force" of the contributor at the date of his retirement, except that a contributor must have to his credit at least ten years of pensionable service to receive any benefit other than a return of contributions.

Note 2: "Retirement because of age" in this summary means ceasing to be a member of the Force at or after the prescribed retirement age applicable to the contributor for any reason other than compulsory retirement because of disability or misconduct; retirement age depends upon rank and ranges from age 56 for constables to age 62 for the Commissioner.

Note 3: "Return of contributions" means return of a contributor's total current service and prior service contributions without interest.

- Note 4: "Cash termination allowance" means an amount equal to one month's pay for each year of pensionable service at the rate of pay authorized to be paid to the contributor at the time he ceases to be a member of the Force.
- Note 5: "Immediate annuity" means an annuity that becomes payable to a contributor immediately upon his becoming entitled thereto. The annual amount of annuity is equal to 2% of average annual pay in respect of any selected six year period of pensionable service multiplied by the number of years of pensionable service up to a maximum of 35. The six year period may consist of consecutive periods of pensionable service totalling six years. The annuity is ordinarily payable in equal monthly instalments in arrears until the end of the month in which the contributor dies.
- Note 6: "Deferred annuity" means an annuity that becomes payable to a contributor at age 60. The annual amount of annuity is computed as described in Note 5. If a contributor who has become entitled to a deferred annuity becomes disabled before attaining age 60, he ceases to be entitled to that deferred annuity and becomes entitled to an immediate annuity.
- Note 7: A "reduced immediate annuity" may be paid to a contributor with 10 but less than 20 years of service in the Force, at his option, if his retirement is due to a reduction in the establishment of the Force, or, in any other case of compulsory retirement to promote economy or efficiency, if the Treasury Board so authorizes. Under these circumstances, "reduced immediate annuity" means an immediate annuity, reduced, until such time as the contributor reaches age 65, by 5% for each full year not exceeding six by which the period of his service in the Force is less than 20 years.
- Note 8: In the case of compulsory retirement because of misconduct, the Treasury Board has the power to specify that the contributor become entitled to the whole or any part of the cash termination allowance or annuity to which he would have become entitled on retirement because of age as respects a contributor who has reached retirement age or on compulsory retirement to promote economy or efficiency due to a reduction in the establishment of the Force as respects any other contributor. However, any reduction specified by the Treasury Board is limited to the extent that the reduced cash termination allowance or the capitalized value of the reduced annuity cannot be less than the amount of a return of contributions. For this purpose, the capitalized value of an annuity is calculated in accordance with the a(f) and a(m) Ultimate tables of mortality and interest at 4% per annum.
- Note 9: "Annual allowance" to a contributor, other than an officer, means an allowance, payable immediately, equal to three-quarters of the annuity to which he would have been entitled upon compulsory retirement because of disability increased by 5% of such annuity for each full year of service in the Force over 20.
- Note 10: "Annual allowance" to an officer contributor means an allowance, payable immediately in the case of a contributor of age 50 or over, or payable at age 50 in the case of a contributor of age less than 50, computed as the actuarial equivalent of the deferred annuity described in Note 6 in accordance with the a(f) and a(m) Ultimate tables of mortality and interest at 4% per annum. If a contributor who has become entitled to an annual allowance payable at age 50 becomes disabled before attaining age 50, he ceases to be entitled to that annual allowance and becomes entitled to an immediate annuity.

Note 11: "Annual allowance" to the widow of a contributor means one-half of the annual amount of annuity computed as described in Note 5. This is termed the "basic allowance." If the age of the contributor exceeds that of the widow by more than twenty years, the widow's allowance is reduced. If a contributor dies within five years after his marriage, the widow's allowance may be reduced unless the Treasury Board is satisfied that anticipation of impending death was not a consideration affecting the agreement to marry. If a widow remarries, her allowance is

- (a) suspended during the period of remarriage, or
- (b) forfeited, if she receives, upon her request, a return of contributions less all payments made to the contributor, widow and children; such request can only be made during the period of remarriage and after the youngest child of the contributor has attained age 18.

"Annual allowance" to each child of a deceased contributor means one-fifth of the basic allowance, or, if there is no living widow of the contributor, two-fifths of the basic allowance. The allowance is payable until the child attains age 18. The total amount of annual allowances payable to the children of a deceased contributor may not exceed four-fifths of the basic allowance, or, if there is no living widow, eight-fifths of the basic allowance.

Note 12: At the time that

- (a) a contributor dies leaving no widow or children entitled to an annual allowance, or
- (b) a contributor's last dependant to whom an annual allowance is payable dies or otherwise ceases to be entitled thereto,

any amount by which the amount of a return of contributions exceeds the aggregate of all amounts that have been paid to the contributor, his widow and his children, is paid to the contributor's estate.

Note 13: The annual allowances payable are computed in the manner and subject to the conditions described in Note 11. However, a widow who married a person of age 60 or over after he became entitled to an annuity or annual allowance payable out of the Account is not entitled to an annual allowance unless such person subsequently became a member of the Force. Also, a child who was born to, adopted by, or became the stepchild of a person of age 60 or over after he became entitled to an annuity or annual allowance payable out of the Account is not entitled to an annual allowance unless

- (a) such person subsequently became a member of the Force, or
- (b) in the case of a child born to such person, the child was conceived before that person attained age 60 or ceased to be a member of the Force.

Contributions:

By contributor -

(a) Current Service

The rates of contribution for members of the Force who come under the new Act are - for males, 6% of pay,  
for females, 5% of pay.

Contributions cease after a contributor has to his credit 35 years of pensionable service.

(b) Prior Service

A contributor may elect to contribute in respect of any period of pensionable service served prior to becoming a contributor.

In general, if a contributor makes an election in respect of a period of pensionable prior service within one year after he becomes a contributor, the amount of contributions required is equal to the total contributions that would have been made during that period of service at the rate of contribution specified above for current service together with simple interest at 4% per annum to the date of election. There are exceptions to this general rule. For example, a member of the Force who becomes a contributor under the new Act by election, not having been a contributor under Part V of the former Act at the date on which the new Act came into force, is entitled to count as pensionable service any period of service that he was entitled under Part II or III of the former Act to count for pension purposes. In respect of such service, no interest is charged on the contributions required to be paid.

If a contributor fails to make an election in respect of a period of pensionable prior service within the time prescribed therefor, he may make election at any time before he ceases to be a member of the Force provided that he is in good health at date of election. However, the amount of contributions required in respect of such period of service is computed on the basis of pay at the rate authorized to be paid to the contributor at the time he makes election.

Contributions in respect of prior service may be paid in a lump sum or by monthly instalments for life, or for a period of years or life whichever is the shorter. Monthly instalments are computed on the basis of the Canadian Life Table No. 2 (1941), Males or Females, as the case may be, and interest at 4% per annum.

By Government -

At the end of each calendar quarter, the Government credits to the Account

- (a) an amount, representing interest, equal to 1% of the balance to the credit of the Account at the end of the preceding quarter, and
- (b) an amount related to the current service and prior service contributions paid by contributors during the preceding quarter as is specified by the Minister of Finance; since the Account was established in 1949, credits have been made at the rate of one and two-thirds of total contributions paid by contributors.

After any pay increase of general application to the Force, the Government credits to the Account the amount estimated to be necessary to provide for the excess of the value of the increase in benefits over the value of the increase in contributions resulting from the pay increase.

Changes in the Plan effected by the new Act:

The new Act created a complete change in the concept of pension arrangements for members of the Force. Under Part V of the former Act, benefits to contributors and their dependants existed as a matter of grace, the Governor in Council being empowered to grant certain benefits to a contributor on his ceasing to be a member of the Force and to the dependants of a contributor on his death. Under the new Act, a contributor and his dependants have a legal right to the benefits specified in the provisions of the Act.

Under the new Act, coverage is extended to civilians employed by the Force who are not appointed or employed under the provisions of the Civil Service Act. Persons in this class are designated, by regulation, as members of the Force for purposes of the plan.

The more significant changes in the details of the plan are described below:

1. The new Act re-opened admission to the plan, on election, for members of the Force who had been members of the Force at the effective date of Part V of the former Act but who did not elect to become contributors under that Part.

2. Under the new Act, an officer contributor may voluntarily retire with entitlement to an annuity or annual allowance after 20 years of service in the Force. Under Part V of the former Act, the only benefit that could be granted to an officer contributor on voluntary retirement was a return of contributions, regardless of the length of his service.

3. The new Act provides for the prescribing, by regulation, of a "retirement age" for each rank or class. At or after such age a contributor may voluntarily retire with entitlement to an immediate annuity provided that he has to his credit at least 10 years of service in the Force at the date of his retirement. Although there was no similar provision under Part V of the former Act, the policy of the Force was that retirement should take place on completion of 35 years of pensionable service or on attainment of certain specified ages, according to rank, whichever was earlier.

4. Under the new Act, the type of benefit payable on either compulsory retirement because of disability or death leaving dependants is related to number of years of pensionable service instead of service in the Force as was the case under Part V of the former Act.

5. Under the new Act, a "deferred annuity" benefit is provided, at the option of the contributor, on retirement under certain circumstances. Part V of the former Act made no provision for a "deferred annuity" benefit under any circumstances.

6. Under the new Act, the amount of an annuity or annual allowance depends on average annual pay received by a contributor during any selected six year period of pensionable service. This period, of course, is always the one that produces the highest average annual pay. Under Part V of the former Act, the amount of pension was based on average annual pay and allowances received by a contributor during his last six years of service. However, a refund of contributions was made in respect of pay and allowances received by a contributor during any six year period of his pensionable service in excess of the pay and allowances received by him during the last six years of service.



7. Under the new Act, the widow of a contributor who was age 60 or over at the date of marriage is entitled to an annual allowance provided that

- (a) the contributor was a member of the Force at the date of marriage, or
- (b) if he was entitled to an annuity or annual allowance at the date of marriage, he subsequently again became a member of the Force.

Under Part V of the former Act the widow of a contributor who was age 60 or over at the date of marriage was not entitled to an annual allowance under any circumstances.

8. The new Act provides for increased maximum annual allowances to children. Under Part V of the former Act, the amount of annual allowance payable to an eligible child was equal to 20% of the widow's allowance if there was a living widow or 40% of the widow's allowance if there was no living widow. These amounts also apply under the new Act. However, under Part V of the former Act, each child's allowance could not exceed \$300 per annum if there was a living widow or \$600 per annum if there was no living widow. These limitations were not carried over to the new Act. Also, under Part V of the former Act, total annual allowances payable to children were limited to 50% of the widow's allowance if there was a living widow or 100% of the widow's allowance if there was no living widow. The corresponding limits under the new Act are 80% and 160% of the widow's allowance.

9. Under the new Act, the rate of contribution for current service is 6% of pay for male contributors and 5% of pay for female contributors. Under Part V of the former Act, the rates of contribution were 5%, 5½% or 6%, depending on the level of pay and allowances of the contributor without regard to sex.

10. The new Act provides that an actuarial report on the state of the Account be laid before Parliament at least once in every five years. There was no such provision under Part V of the former Act.

#### Data

The Pay and Pensions Division of the Treasury Office of the Royal Canadian Mounted Police Headquarters supplied files of manual record cards which contained all details necessary for the valuation of the plan. These files included a card for each member of the Force who was a contributor under the plan and each person who was entitled to an annuity or annual allowance payable out of the Account at any time between January 1, 1955, and December 31, 1959.

In the table on the following page are shown pertinent membership and termination statistics for the period from January 1, 1955, to December 31, 1959.

I. Members of the Force

Contributors on Jan. 1/55	New Contributors Jan. 1/55 to Dec. 31/59	Type of Benefit	Terminations during period Jan. 1, 1955 - Dec. 31, 1959						Contributors on Dec. 31/59
			Age*	Compulsory Retirement			Voluntary Retirement	Death in Service	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Annuity	25	4	11	2	21	9	
		Lump sum	-	12	162	26	809	23	
2,604	2,514		25	16	173	28	830	32	4,014

\* Under Part V of the former Act there was no specific provision for retirement because of age. The figure in column (4) was derived by subtracting the number of retirements with entitlement to pension for reasons specified in the headings of columns (5) to (8) from the total number of retirements with entitlement to pension.

II. Persons entitled to Annuities or Annual Allowances

Retired Contributors

Entitled on Jan. 1/55	New Entitlements Jan. 1/55 to Dec. 31/59	Terminated by Death Jan. 1/55 to Dec. 31/59	Entitled on Dec. 31/59
31	63	4	90

Widows

Entitled on Jan. 1/55	New Entitlements Jan. 1/55 to Dec. 31/59	Terminations during period Jan. 1/55 - Dec. 31/59		Entitled on Dec. 31/59
		Death	Remarriage	
9	13	0	4	18

Children

Entitled on Jan. 1/55	Entitled on Dec. 31/59
9	20

## Valuation Bases and Assumptions

### General

There were no female contributors at the date of valuation. Also, it is almost certain that the number of female contributors under the new Act will be such a small proportion of the total number of contributors that the aggregate experience under the plan will not be affected by the experience of female contributors to any significant extent. For this reason, valuation bases were chosen and assumptions made with no more than cursory consideration given to the probable future experience of female contributors.

For pension plans that include provision for retirement to pension because of disability, different mortality assumptions are usually made in respect of persons entitled to pension because of disability and persons entitled for other reasons. For this plan, the group of disability pensioners is very small, both in number and as a proportion of the total. For example, as at December 31, 1959, out of a pensioner roll of 90 persons only about 7% had become entitled to pension because of disability. For this valuation, therefore, all persons entitled to pension both at the date of valuation and in the future were considered to be subject to the same mortality experience.

#### 1. Interest

The Royal Canadian Mounted Police Superannuation Regulations provide that interest shall be credited to the Account at the rate of 1% quarterly, that is, at the rate of 4% per annum, approximately. The interest basis for the valuation was therefore taken as 4% per annum.

It may also be mentioned that, where an interest basis is necessary for calculations under the Act, the Regulations prescribe the interest basis to be 4% per annum.

#### 2. Salary Scales

The term "salary scale," as used in this report, denotes the predicted pattern of increase in pay from age to age over future years.

The manner in which pay will increase from age to age in the future must be predicted for valuation purposes because

- (a) annuity and annual allowance benefits depend on the average pay received during a selected six year period of pensionable service (ordinarily, the period selected is the last six years of service),
- (b) the cash termination allowance benefit depends on the rate of pay authorized at termination of service, and
- (c) future current service contributions depend on pay received during future years of service.

There are two main forces that tend to generate increases in the pay of an individual during his working lifetime. The first may be thought of as a "promotional" force. As an employee gains experience and attains new or higher skills in his work, he is normally rewarded by periodic increases in his pay. Such increases are hereafter referred to as "promotional" increases. The second force arises from either increased productivity or inflation in the economy. Increases in pay resulting from this force are hereafter referred to as "economic" increases.

The pattern of average promotional increases in pay in most stable employment areas is fairly predictable on the basis of past experience. On the other hand, little confidence can be placed in predictions of future increases

pay that depend on varying economic and sociological pressures. It is therefore usual in the valuation of pension plans under which pensions are determined as a percentage of pay to take account only of promotional increases in the development of salary scales and in the consequent calculations of the net liability in respect of current contributors and of contribution rates required in respect of new contributors. The result of this practice is that, assuming economic increases in pay between the dates of consecutive valuations, each new valuation of a pension plan shows the creation of a deficit, an increase in the deficit or a decrease in the surplus in the fund during the inter-valuation period, depending on the financial state of the fund at the date of the previous valuation.

As noted earlier in this report, the Royal Canadian Mounted Police Superannuation Act provides that an amount estimated to be equal to the additional net liability created by a general pay increase shall be credited to the Account as soon as possible after the increase. The implication in this provision is that the Government, as employer, has assumed responsibility for the additional net liabilities created under the plan as a result of general pay increases. In the development of the "basic" salary scale for this valuation, therefore, only promotional increases in pay were taken into account.

From December 31, 1949, in which year Part V of the former Act came into force, to December 31, 1959, the date of the current examination of the Account, the level of average pay for members of the Force increased by about 60%. This represented an annual increase rate of more than  $4\frac{1}{2}\%$  over the ten year period. In 1960, there was a further general increase in pay averaging about 11%. Because of the substantial cost arising from such economic increases in pay, it seemed appropriate to construct a "supplementary" salary scale based on the assumption that the pattern of promotional increases in pay from age to age would be that represented by the basic salary scale and, in addition, that the general level of pay would increase by  $2\frac{1}{2}\%$  per annum throughout the future. Substitution of this supplementary salary scale for the basic salary scale in the valuation functions would then provide the means to investigate what the state of the Account would have been as at December 31, 1959, and what contribution rate would be required in respect of new contributors after that date if the pay increase conditions represented by the supplementary salary scale were to prevail in future years and no special credits were to be made to the Account from time to time as a result of general pay increases.

The data supplied by the Pay and Pensions Division included the rate of pay authorized to be paid to each contributor on December 31, 1959. From these data together with similar data provided for the examination of the Account as at December 31, 1954, and information concerning pay scales and the promotional and retirement policies now in effect in the Force, "basic" and "supplementary" salary scales were constructed in accordance with the assumptions described above. They are shown in Appendix 1.

In Appendix 2 is shown, for specimen ages, the manner in which an initial amount of pay of \$1,000 per annum would increase in the future on the basis of the salary scales shown in Appendix 1.

### 3. Rates of mortality and remarriage

For valuation purposes, mortality rates expected to be experienced in the future were required for each of the following groups:

- (a) contributors who are members of the Force;
- (b) contributors entitled to annuities or annual allowances;
- (c) widows of deceased contributors;
- (d) children of deceased contributors.

Widows' allowances are suspended on remarriage. Thus, rates of remarriage were needed for their valuation.

The bases used in the valuation are described in the following paragraphs:

(a) Contributors who are members of the Force

Only 32 deaths occurred among this group during the period from January 1, 1955, to December 31, 1959. In view of this small number of deaths, investigation of mortality was limited to comparing the number and incidence of actual deaths with the number and incidence of deaths that would have occurred in accordance with the rates of

- (i) tables of mortality developed from the mortality experience of other Government employee groups, and
- (ii) recent standard mortality tables.

As a result of these tests, the mortality table used for the 1954 valuation, namely, the Canadian Association of Actuaries 1949-52 Ultimate Table of Mortality, was considered to be suitably representative of the experience to be expected and was used for this valuation. The rates are shown in Appendix 3.

(b) Contributors entitled to annuities or annual allowances

Past mortality experience has been too limited to do more than indicate that mortality may be very favourable for this group.

The mortality rates of the a-1949 Table were used in this valuation both for contributors entitled to an annuity or annual allowance at date of valuation and for those who become so entitled in the future. These rates and the relevant annuity values are shown for ages 40 to 90 in Appendix 4.

(c) Widows

The bases chosen for the valuation of both present and prospective widows' allowances were

- (i) for mortality - aggregate rates derived from the 1948-57 experience of widows entitled to annual allowances under the Public Service Superannuation plan, and
- (ii) for remarriage - select and ultimate rates derived from the 1940-57 experience of widows awarded pensions under the Pension Act and previous Government administrative orders from August 4, 1914, to December 31, 1957.

In Appendix 5 are shown

- (i) select remarriage rates for quinquennial ages at widowhood 25 to 55 and specimen durations from widowhood,
- (ii) ultimate remarriage rates and aggregate mortality rates for quinquennial ages commencing at age 39, and
- (iii) annuity values based on the probabilities of payments ceasing as a result of remarriage or death for the ages and durations noted in (i) and (ii) above.

(d) Children

Payments of annual allowances to children cease at age 18. Since the mortality of children under age 18 is very low, it was deemed suitable to value children's allowances without taking account of mortality.

4. Rates of retirement with entitlement to an annuity or annual allowance for reasons other than disability

Under Part V of the former Act there was no provision for a deferred annuity benefit and no provision for a choice of benefits by a retiring contributor. Contributors under that Part who ceased to be members of the Force for reasons other than disability and at the time of ceasing to be members had 10 or more years of service in the Force were granted an annual pension or a return of contributions depending on type of termination and length of service in the Force. Under the new Act, such contributors, other than those who have reached their prescribed retirement ages, ordinarily have the option of electing to receive either an annuity - immediate or deferred - or a return of contributions.

From the 1955-59 experience under Part V of the former Act, actual rates of retirement with entitlement to pension for reasons other than disability were calculated and smoothed by graphical graduation. The resulting rates were assumed, for this valuation, to be representative of the rates of retirement of contributors with entitlement to an annuity or annual allowance under the new Act exclusive of

- (a) contributors retiring because of disability, and
- (b) certain contributors who, on voluntary retirement, may elect to take a deferred annuity.

These rates are shown in Appendix 6.

As indicated above, the rates shown in Appendix 6 do not take account of a certain group of contributors who, on voluntary retirement under the new Act, have the option of electing to take a deferred annuity but who, on voluntary retirement under Part V of the former Act, would have been eligible only for a return of contributions. This group consists of

- (a) contributors, other than officers, with 10 but less than 20 years of service in the Force, and
- (b) officer contributors with 20 but less than 35 years of service in the Force.

In section 6 below are described rates of retirement representative of the 1955-59 experience under Part V of the former Act as respects retirements with return of contributions. Such retirements consisted mainly of contributors retiring with less than 10 years of service in the Force but also included certain groups of contributors retiring with 10 or more years of service in the Force including the group of voluntary retirements described in the preceding paragraph. What proportion of this latter group would elect to take a deferred annuity is difficult to predict. Some indication of the probable proportion may be had from the experience of male contributors under the Public Service Superannuation Act and its predecessor Act for the period from January 1, 1948, to December 31, 1957. For this experience, the proportion of male whole-time contributors who elected to take a deferred annuity on retirement for reasons other than disability, with 5 or more years of pensionable service to their credit, ranged from 10% for age 30 to 25% for age 50. It seemed not unreasonable, therefore, to assume that, of those contributors who voluntarily retire under the new Act between the ages of 30 and 50 and are eligible to elect to take a deferred annuity, 25% will so elect. In practice, it was assumed for this valuation that 25% of contributors retiring at ages 30 to 49, inclusive, in accordance with the rates described in section 6 below and shown in Appendix 8 will elect to take a deferred annuity.

5. Rates of retirement because of disability

This category consists of compulsory retirements because of disability with entitlement to either a cash termination allowance or an immediate annuity. There were 16 such retirements during the experience period from January 1, 1955, to December 31, 1959. Exactly the same number of retirements would have occurred if experience had followed the rates of retirement because of disability derived from the experience of male officers who were contributors under Part V of the Defence Services Pension Act during the period from April 1, 1946, to December 31, 1955. These male officer rates were thus considered appropriate for valuation purposes. They are shown in Appendix 7.

6. Rates of retirement with return of contributions

From the 1955-59 experience under Part V of the former Act, actual rates of retirement with return of contributions were calculated and smoothed by graphical graduation.

For this valuation, 100% of these rates for ages 29 and under and 75% of these rates for ages 30 and over were assumed to represent the rates of retirement with return of contributions that may be expected under the new Act. As explained in section 4 above, 25% of the rates for ages 30 and over were assumed to pertain to contributors who voluntarily retire and elect to take a deferred annuity.

The derived rates are shown in Appendix 8.

7. Proportions of male contributors married at death, and  
Average ages of widows corresponding to ages of contributors at death

These proportions and average ages were needed to value prospective benefits of future widows both of contributors who are members of the Force at death and of contributors entitled to an annuity or annual allowance at death.

Deaths among contributors have been so few to the present time that it was clearly impossible to make any predictions concerning marital status and age differences at the death of contributors based on data in respect of deceased contributors. For valuation purposes, it was assumed that the proportions of contributors married at death and the average ages of widows corresponding to ages of contributors at death would be suitably represented by

- (a) for contributors who are members of the Force at death, the proportions married and the average ages of wives of contributors who were members of the Force on December 31, 1959, and
- (b) for contributors entitled to an annuity or annual allowance at death, the proportions married and the average ages of widows derived from the experience of persons who died during the period from January 1, 1948, to December 31, 1957, while entitled to an annuity or annual allowance under the Public Service Superannuation Act or its predecessor Act.

These factors are shown for quinquennial ages of contributors at death in Appendix 9.

8. Children's benefits

For each age at death of contributors, there was needed the value of children's benefits per \$1.00 of the annuity payable to a contributor or that would have been payable to a contributor if he had retired with entitlement to an immediate annuity at the date of his death. Values determined for the examination of the Public Service Superannuation Account as at December 31, 1957, were considered suitable for valuation purposes. They are shown in Appendix 9.



> Capitalized values of benefits

In Appendix 10 are shown, for quinquennial ages, the values of benefits emerging

- (a) on retirement with entitlement to an immediate annuity or annual allowance, and
- (b) on death leaving dependants with entitlement to an annual allowance.

For retirements, the values include provision for prospective annual allowances to widows and children. All values include provision for payment of an aggregate amount of benefit at least equal to the contributor's total contributions without interest.

Contribution Rates

Under the new Act, contributions payable by contributors for current service are equal to 6% of pay for males and 5% of pay for females, and contributions for periods of prior service are, in the usual case, based on these same rates. Also, from commencement of the plan in 1949 to the date of the current valuation, credits equal to one and two-thirds of total current service and prior service contributions by contributors were made to the Account on behalf of the Government. Thus, assuming that Government credits continue to be made at the same proportion of contributions by contributors as in the past, total credits to the Account under the new Act will ordinarily be at a rate of 16% of pay received by male contributors and 13 1/3% of pay received by female contributors for any period of pensionable service.

As indicated earlier in this report, it seemed appropriate to estimate the contribution rates required in respect of new contributors to pay for the benefits provided under the new Act

- (a) when only promotional increases in pay are taken into account, and
- (b) when both promotional increases and certain assumed economic increases in pay are taken into account.

The rates shown in the schedule below under the heading "Promotional Increases Only" were calculated using the basic salary scale and those shown under the heading "Promotional and Economic Increases" were calculated using the supplementary salary scale. As explained previously, the basic salary scale represents the predicted pattern of increase in pay from age to age when no account is taken of possible future economic increases in the level of pay, whereas the supplementary salary scale represents the predicted pattern of increase in pay from age to age when account is taken of economic increases in the level of pay at the rate of 2 1/2% per annum.

The contribution rates shown in the schedule are the rates estimated to be required in respect of persons becoming contributors at ages 20, 25 and 30 and the average rates estimated to be required in respect of all new contributors. The average rates were calculated by weighting the rates for individual ages in accordance with the age distribution of persons who became contributors over the period from January 1, 1955, to December 31, 1959 (Appendix 11). Also shown in the schedule is



a breakdown of the total rates into the component rates required to provide benefits payable to the contributor or his estate and to the dependants of the contributor.

Contribution Rates required in respect of New Contributors  
(percentages of pay)

<u>Age at Becoming Contributor</u>	<u>Promotional Increases Only</u>			<u>Promotional and Economic Increases</u>		
	<u>Contributor</u>	<u>Dependants</u>	<u>Total</u>	<u>Contributor</u>	<u>Dependants</u>	<u>Total</u>
20	12.4%	1.9%	14.3%	18.4%	2.9%	21.3%
25	13.7	2.1	15.8	19.0	3.0	22.0
30	14.2	2.3	16.5	18.7	3.0	21.7
Weighted Average	12.5%	1.9%	14.4%	18.4%	2.9%	21.3%

Examination of the above rates clearly reveals the significance of economic increases in pay on the cost of benefits under this plan. If future economic increases in pay should average 2½% per annum, as assumed in the construction of the supplementary salary scale, then to provide for benefits in respect of new contributors it would be necessary for the Government to credit the Account either with amounts equal to about 15.3% of pay on a continuing basis or with equivalent amounts consisting of amounts equal to some lower percentage of pay on a continuing basis and lump sum amounts at the time of general pay increases.

General Pay Increases

Annuity and annual allowance benefits provided under this plan are based on annual pay obtained by averaging pay received over a selected period of six years - usually the last six years of service in the Force. For this type of plan, any increase in the general level of pay creates an additional net liability in respect of employed contributors because the increase in the value of future benefits resulting from a pay increase is greater in amount than the corresponding increase in the value of future contributions.

There were two general pay increases for members of the Force during the period from January 1, 1955, to December 31, 1959. The first such increase, effective April 1, 1956, raised the average level of pay in the Force by about 7½%; the second, effective May 1, 1957, raised the average level of pay by about 6½%. Credits to the Account, representing the estimated additional net liabilities created by these pay increases, amounted to \$750,000 and \$715,000, respectively. Since the date of valuation, there has been a further general pay increase, effective September 1, 1960, averaging about 11% of pay. The additional net liability estimated to have been created by that increase was \$1,760,000.

Valuation Summary

The following balance sheets summarize the results of the valuation and show the financial status of the Account as at December 31, 1959, when, as respects current contributors, (a) only promotional increases in pay are taken into account, and (b) promotional increases and economic increases at the rate of 2½% per annum are taken into account. For both balance sheets, it was assumed that Government credits to the Account will continue to be made at the rate of one and two-thirds of total current service and prior service contributions paid by contributors.

Valuation Balance Sheets as at December 31, 1959

I. Promotional Increases Only

		<u>Assets</u>	
Balance of Account			\$18,772,000
Outstanding credits from Government			1,353,000
Present value of future contributions from Province of Newfoundland			245,000
Present value of future contributions from contributors:			
<u>Members of the Force</u>			
Current service	\$12,637,000		
Prior service	<u>191,000</u>	\$12,828,000	
<u>Retired contributors</u>			
Prior service		<u>35,000</u>	12,863,000
Present value of future credits from Government			<u>21,438,000</u>
		Total Assets	\$54,671,000
Deficit			<u>1,556,000</u>
			<u>\$56,227,000</u>

Liabilities

Present value of prospective benefits to contributors who are members of the Force			\$53,320,000
Present value of benefits to persons entitled to an annuity or annual allowance:			
Retired contributors	\$2,626,000		
Widows	236,000		
Children	<u>13,000</u>		2,875,000
Contributions held pending refund to former members of the Force			<u>32,000</u>
			<u>\$56,227,000</u>

II. Promotional and Economic Increases

Assets

Balance of Account			\$18,772,000
Outstanding credits from Government			1,353,000
Present value of future contributions from Province of Newfoundland			245,000
Present value of future contributions from contributors:			
<u>Members of the Force</u>			
Current service	\$16,727,000		
Prior service	<u>191,000</u>	\$16,918,000	
<u>Retired contributors</u>			
Prior service		<u>35,000</u>	16,953,000
Present value of future credits from Government			<u>28,255,000</u>
		Total Assets	\$65,578,000
Deficit			<u>26,995,000</u>
			<u>\$92,573,000</u>

Liabilities

Present value of prospective benefits to contributors who are members of the Force			\$89,666,000
Present value of benefits to persons entitled to an annuity or annual allowance:			
Retired contributors	\$2,626,000		
Widows	236,000		
Children	<u>13,000</u>		2,875,000
Contributions held pending refund to former members of the Force			<u>32,000</u>
			<u>\$92,573,000</u>

From the first balance sheet it may be seen that, if only promotional increases in pay are taken into account, the estimated deficit as at December 31, 1959, was \$1,556,000.

In the preceding examination of the Account, also made taking only promotional increases in pay into account, it was estimated that the deficit as at December 31, 1954, was \$1,189,000. The Chief Actuary, in his report on that examination, suggested three possible courses of action to eliminate the deficit. One such course was to "Continue the present rate of contribution and make no special payment to liquidate the deficit." The practicability of this course was based on the fact that the average contribution rate estimated to be required, for contributors and Government combined, to provide for benefits under Part V of the former Act in respect of new contributors was 13 $\frac{1}{2}$ % of pay whereas the current contribution rate was 16% of pay for most contributors. Thus, if there were no future general pay increases or if amounts equal to the additional net liabilities created by future general pay increases were credited to the Account at the time of such increases, excess contributions in respect of new contributors would gradually liquidate the deficit. This was the course actually followed. The contribution rate was continued at 6% of pay for the main body of contributors and credits equal in amount to one and two-thirds of total current service and prior service contributions paid by contributors were continued to be made to the Account on behalf of the Government. Also, amounts estimated to represent the additional net liabilities created by the two general pay increases in the period from January 1, 1955, to December 31, 1959, were credited to the Account subsequent to those increases. In spite of this, the estimated deficit as at December 31, 1959, was \$367,000 higher than the estimated deficit as at December 31, 1954.

There were four main reasons for the increase in the estimated deficit over the 1955-59 period.

1. As noted at the beginning of this report, the current valuation was based on the benefits provided under the new Act which are somewhat more liberal than the benefits that were provided under Part V of the former Act. The effect of the changes in benefits was an increase in the benefit liability.

2. The rates of retirement with entitlement to pension for ages 56 to 59 proved to be higher during the 1955-59 period than the rates used in the 1954 valuation. In other words, contributors retired at earlier ages, on the average, during the 1955-59 period than would have been the case if experience had followed the rates assumed for the 1954 valuation. Thus, the cost of annuity benefits in respect of contributors retiring with entitlement to pension during the 1955-59 period was higher than that expected. Also, the rates of retirement with entitlement to an annuity or annual allowance that were used for ages 56 to 59 in the current valuation were based on the actual experience over the 1955-59 period. This had the effect of producing a benefit liability higher than that which would have been produced if the 1954 valuation rates had proved representative of actual experience and had been used in the current valuation.

3. The rates of retirement with return of contributions were substantially lower for ages 23 to 35 during the 1955-59 period than the corresponding rates for the 1949-54 period. Thus, because the rates assumed for the 1954 valuation were based on the experience of the 1949-54 period, the aggregate amount released in respect of contributors who retired with return of contributions during the 1955-59 period was less than that expected. Also, because the rates of retirement with return of contributions assumed for the current valuation were based on the experience of the 1955-59 period, the estimated benefit liability as at December 31, 1959, was considerably higher than it would have been if the 1954 valuation rates had again been used.

4. Because the estimated amount of the deficit in the Account as at December 31, 1954, was not thereafter added to the balance of the Account for the purpose of crediting interest on it, an additional deficit was created equal in amount to the interest on the deficit from time to time over the 1955-59 period.

In the development of the second balance sheet, it was assumed that

- (a) future economic increases in pay would take place at an average rate of  $2\frac{1}{2}\%$  per annum, and
- (b) credits representing additional net liabilities created by future general pay increases would not be made to the Account at the time of such increases.

On this basis, the estimated deficit as at December 31, 1959, was nearly \$27 million - an amount almost 150% of the balance in the Account at that date. At first glance, a deficit of this size might appear unreasonably large. In fact, it would be much too low if the general level of pay were to increase in the future at the average rate - more than  $4\frac{1}{2}\%$  per annum - that has prevailed since the inception of the plan. Also, because contributions at the rate of 6% of pay for male contributors and 5% of pay for female contributors together with Government credits equal to one and two-thirds of total contributions paid by contributors would not be sufficient, on the average, to provide for benefits in respect of new contributors, the deficit would continue to increase as new members joined the plan. If, however, future experience were to follow the above assumptions and credits were to be made to the Account on behalf of the Government at the rate of 15.3% of pay for all contributors, that is, at the rate estimated to be required to provide for benefits in respect of new contributors in addition to their own contributions, the deficit in the Account would have been about \$12 million as at December 31, 1959, and this deficit would not be subject to increase because of a deficiency in credits to the Account in respect of new contributors.

Summary

1. If future increases in the general level of pay are not taken into account, the average contribution rate estimated to be required to provide for benefits in respect of new contributors is, for contributors and Government combined, 14.4% of pay.

If the rate of contribution remains at 6% of pay for male contributors and 5% of pay for female contributors and the Government continues to credit the Account with

- (a) amounts equal to one and two-thirds of total current service and prior service contributions paid by contributors, and
- (b) at the time of general pay increases, amounts representing the additional net liabilities created by such increases,

the estimated deficit in the Account as at December 31, 1959, was \$1,556,000.

Under the circumstances described in the preceding two paragraphs, it is believed that the margin between the actual and required contributions in respect of new contributors would provide for the eventual liquidation of the deficit, provided that interest were to be credited to the Account on the amount of the deficit from time to time to keep it from growing with interest.

2. If increases in the general level of pay at the rate of 2½% per annum were assumed to be applicable throughout the future and special credits were not to be made to the Account at the time of general pay increases, the average contribution rate estimated to be required to provide for benefits in respect of new contributors would be, for contributors and Government combined, 21.3% of pay.

In conclusion, it is a pleasure to acknowledge the cooperation and assistance of the Treasury Office of the Royal Canadian Mounted Police Headquarters throughout this examination.

Respectfully submitted,



Chief Actuary

Department of Insurance,  
July 18, 1961

A P P E N D I X 1

Salary Scales

<u>Age</u>	<u>Basic</u>	<u>Supplementary</u>
17	.488	.169
18	.516	.183
19	.541	.197
20	.565	.210
21	.586	.224
22	.607	.237
23	.626	.251
24	.644	.265
25	.660	.278
26	.676	.292
27	.691	.306
28	.706	.320
29	.720	.335
30	.733	.350
31	.746	.365
32	.759	.380
33	.771	.396
34	.782	.412
35	.794	.428
36	.804	.445
37	.815	.462
38	.825	.479
39	.835	.497
40	.845	.516
41	.855	.535
42	.864	.554
43	.873	.574
44	.883	.595
45	.891	.615
46	.900	.637
47	.908	.659
48	.916	.681
49	.924	.704
50	.932	.728
51	.939	.752
52	.947	.777
53	.954	.802
54	.961	.828
55	.968	.855
56	.974	.883
57	.981	.911
58	.987	.940
59	.994	.969
60	1.000	1.000

APPENDIX 2

Illustration of Increases in Pay  
in accordance with salary scales

<u>Age</u>	<u>Basic Salary Scale</u>				<u>Supplementary Salary Scale</u>			
20	1000				1000			
25	1170	1000			1324	1000		
30	1299	1110	1000		1663	1256	1000	
35	1406	1202	1082		2036	1538	1225	
40	1497	1280	1152	1000	2453	1853	1475	1000
45	1579	1350	1216	1055	2927	2212	1761	1194
50	1650	1411	1271	1103	3462	2616	2082	1412
55	1714	1465	1320	1145	4067	3073	2446	1658
60	1771	1514	1364	1183	4756	3593	2861	1939



APPENDIX 3

Rates of Mortality for contributors who  
are members of the Force

<u>Age</u>	<u>Mortality Rate</u>
17	.0009
18	.0010
19	.0010
20	.0011
21	.0011
22	.0011
23	.0011
24	.0011
25	.0011
26	.0010
27	.0010
28	.0010
29	.0010
30	.0010
31	.0010
32	.0010
33	.0011
34	.0012
35	.0013
36	.0014
37	.0016
38	.0018
39	.0020
40	.0023
41	.0026
42	.0030
43	.0034
44	.0038
45	.0042
46	.0046
47	.0051
48	.0056
49	.0061
50	.0067
51	.0074
52	.0081
53	.0088
54	.0096
55	.0106
56	.0117
57	.0130
58	.0145
59	.0162
60	.0180

A P P E N D I X 4

Rates of Mortality for contributors entitled  
to annuities or annual allowances  
and  
Annuity Values based thereon

Age at Retirement	Mortality Rate	Value of Annuity of \$1.00 per annum (interest at 4% per annum)
40	.0020	\$18.232
41	.0022	17.979
42	.0025	17.718
43	.0028	17.452
44	.0032	17.179
45	.0036	16.902
46	.0041	16.620
47	.0047	16.334
48	.0053	16.045
49	.0059	15.752
50	.0066	15.456
51	.0073	15.156
52	.0080	14.854
53	.0088	14.550
54	.0097	14.242
55	.0106	13.931
56	.0115	13.618
57	.0125	13.301
58	.0135	12.981
59	.0145	12.658
60	.0157	12.331
61	.0169	11.999
62	.0182	11.665
63	.0197	11.326
64	.0213	10.985
65	.0231	10.642
66	.0250	10.297
67	.0272	9.950
68	.0296	9.603
69	.0322	9.256
70	.0351	8.909
71	.0383	8.563
72	.0418	8.219
73	.0456	7.878
74	.0499	7.540
75	.0545	7.206
76	.0596	6.876
77	.0652	6.551
78	.0714	6.232
79	.0781	5.920
80	.0855	5.614
81	.0936	5.316
82	.1024	5.026
83	.1121	4.744
84	.1227	4.471
85	.1342	4.208
86	.1467	3.954
87	.1603	3.709
88	.1751	3.475
89	.1912	3.251
90	.2085	3.037

A P P E N D I X 5

Rates of Remarriage and Mortality for widows

<u>Age at Widowhood</u>	<u>Remarriage Rate</u>					<u>Attained Age</u>	<u>Mortality Rate</u>
	<u>Year of Widowhood</u>						
	<u>1st yr.</u>	<u>3rd yr.</u>	<u>5th yr.</u>	<u>10th yr.</u>	<u>Ultimate</u>		
25	.050	.118	.132	.060	.028	39	.0022
30	.029	.086	.076	.035	.016	44	.0026
35	.018	.048	.042	.019	.009	49	.0033
40	.011	.027	.023	.010	.004	54	.0050
45	.006	.015	.012	.005	.002	59	.0083
50	.004	.008	.006	.002	.001	64	.0141
55	.002	.004	.003	.001	0	69	.0232
						74	.0367
						79	.0559
						84	.0822
						89	.1180

Value of Annuity of \$1.00 per annum payable  
to remarriage or death of widow  
(interest at 4% per annum)

<u>Age at Widowhood</u>	<u>Year of Widowhood</u>					<u>Attained Age</u>
	<u>1st yr.</u>	<u>3rd yr.</u>	<u>5th yr.</u>	<u>10th yr.</u>	<u>Ultimate</u>	
25	\$8.393	\$8.687	\$10.453	\$14.731	\$16.465	39
30	11.992	12.306	13.644	16.232	16.854	44
35	14.821	14.954	15.692	16.759	16.423	49
40	16.326	16.249	16.494	16.407	15.429	54
45	16.717	16.421	16.279	15.414	14.013	59
50	16.209	15.757	15.349	14.013	12.386	64
55	15.142	14.553	13.977	12.386	10.681	69
					9.008	74
					7.447	79
					6.040	84
					4.789	89

A P P E N D I X 6

Rates of Compulsory Retirement, with entitlement  
to an annuity or annual allowance, for  
reasons other than disability

<u>Age at Retirement</u>	<u>Retirement Rate</u>
40	.0101
41	.0120
42	.0139
43	.0158
44	.0177
45	.0196
46	.0216
47	.0238
48	.0262
49	.0288
50	.0326
51	.0356
52	.0389
53	.0425
54	.0464
55	.0506
56	.2726
57	.5312
58	.1526
59	.1860
60	1.0000

A P P E N D I X 7

Rates of Retirement because of disability

<u>Age at Retirement</u>	<u>Retirement Rate</u>
17	.0006
18	.0006
19	.0006
20	.0006
21	.0007
22	.0007
23	.0007
24	.0007
25	.0008
26	.0008
27	.0008
28	.0008
29	.0009
30	.0009
31	.0009
32	.0010
33	.0010
34	.0011
35	.0011
36	.0012
37	.0013
38	.0014
39	.0015
40	.0016
41	.0017
42	.0018
43	.0020
44	.0022
45	.0024
46	.0026
47	.0028
48	.0030
49	.0032
50	.0035
51	.0038
52	.0041
53	.0044
54	.0047
55	.0051
56	.0056
57	.0065
58	.0077
59	.0092

A P P E N D I X 8

Rates of Retirement with return of contributions  
or entitlement to a deferred annuity  
(voluntary retirements only)

<u>Age at Retirement</u>	<u>Retirement Rate</u>
17	.0971
18	.0968
19	.0962
20	.0952
21	.0930
22	.0892
23	.0821
24	.0683
25	.0482
26	.0364
27	.0303
28	.0264
29	.0237
30	.0215
31	.0196
32	.0180
33	.0166
34	.0153
35	.0140
36	.0127
37	.0115
38	.0103
39	.0091
40	.0080
41	.0069
42	.0059
43	.0050
44	.0042
45	.0034
46	.0026
47	.0019
48	.0013
49	.0007

A P P E N D I X 9

Proportions of contributors married at death;  
Average ages of widows corresponding to ages  
of contributors at death;

and

Values of children's benefits per \$1.00 "earned"  
annuity of contributors at death

<u>Age of Contributor at Death</u>	<u>Proportion of Contributors Married at Death</u>		<u>Average Age of Widow</u>		<u>Value of Children's Benefits</u>	
	<u>Members of the Force</u>	<u>Retired Contributors</u>	<u>Members of the Force</u>	<u>Retired Contributors</u>	<u>Members of the Force</u>	<u>Retired Contributors</u>
25	.50	.32	24	24	\$1.62	\$0.58
30	.87	.46	28	29	1.68	.83
35	.93	.58	32	34	1.63	.99
40	.96	.67	37	38	1.42	.98
45	.98	.75	42	43	1.03	.76
50	.98	.80	47	47	.62	.48
55	.98	.83	51	52	.32	.24
60	.98	.83	56	56	.14	.11
65		.80		61		.04
70		.74		65		.01
75		.65		69		
80		.53		73		
85		.39		77		
90		.26		79		

A P P E N D I X 10

Capitalized Values of benefits per \$1.00 "earned"  
annuity of contributors at retirement or death  
(interest at 4% per annum)

On Retirement with entitlement to an immediate annuity

<u>Age at Retirement</u>	<u>Capitalized Value</u>
30	21.231
35	20.399
40	19.494
45	18.315
50	17.012
55	15.586
60	14.026

On Death leaving dependants entitled to annual allowances

<u>Age at Death</u>	<u>Capitalized Value</u>	
	<u>Employed Contributors</u>	<u>Retired Contributors</u>
30	8.039	7.489
35	9.224	8.811
40	9.726	9.406
45	9.585	9.352
50	9.042	8.878
55	8.362	8.243
60	7.646	7.547
65		6.809
70		6.052
75		5.312
80		4.635
85		4.095
90		3.787



A P P E N D I X 11

Age Distribution of members of the Force who became contributors during the period from January 1, 1955, to December 31, 1959

<u>Age at Becoming Contributor</u>	<u>Number</u>
17	4
18	208
19	825
20	611
21	329
22	183
23	104
24	78
25	48
26	29
27	21
28	11
29	9
30	10
31	5
32	5
33	2
34	2
35	4
36	2
37	5
38	2
39	4
40	1
41	4
42	1
43	0
44	1
45	0
46	1
47	3
48	1
49	1
Total	2514