

Canadian Forces Superannuation Act - Part I

Report on Actuarial Examination
of the
Canadian Forces Superannuation Account
in the Consolidated Revenue Fund
as at December 31, 1965

The Canadian Forces Superannuation Act, hereinafter referred to as the "Act", was assented to on July 8, 1959, and proclaimed in force on March 1, 1960. In most respects the provisions of the Act continued the provisions of Part V of the Defence Services Pension Act, Chapter 63 of the Revised Statutes of Canada, 1952, hereinafter referred to as the "former Act". The Canadian Forces Superannuation Account is a continuation under the Act of the Permanent Services Pension Account which was established pursuant to Part V of the former Act.

In accordance with instructions and pursuant to section 25 of the Act, we have made an actuarial examination of the Account as at December 31, 1965, and have the honour to report thereon.

The report has been divided into eight sections, as follows:

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I. Terms of the Superannuation Plan as at December 31, 1965

Membership

Persons covered by this plan comprise

- (a) every member of the regular forces of the Canadian Forces, hereinafter referred to as the "forces", who
- (i) was a contributor under Part V of the former Act immediately before the date on which the Act came into force,
 - (ii) not having been a member of the forces immediately before the date on which the Act came into force, became a member of the forces on or subsequent to that date,
 - (iii) having been a member of the forces at the date on which the Act came into force, thereafter ceased to be a member and subsequently was re-enrolled in the forces,
 - (iv) having been a member of the forces but not a contributor under Part V of the former Act at the date on which the Act came into force, elected to become a contributor under the Act within one year from that date,
 - (v) having been entitled to a pension under any of Parts I to III of the former Act as the date on which the Act came into force, elected to become a contributor under the Act within one year from that date, or

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- (vi) was granted a permanent commission or was appointed as an officer for an indefinite term on or after the date on which the Act came into force, having been enrolled as an officer of the forces temporarily or for a fixed term immediately before such grant or appointment but not having been a man of the forces immediately before he became so enrolled;
- (b) former members of the forces who are entitled to annuities payable out of the Account; and
- (c) widows and children who are entitled to annual allowances as dependants of contributors who died either while members of the forces or while entitled to annuities payable out of the Account.

Pay

The term "pay", as it applies to a contributor under this plan and as it is used throughout this report, means pay at the rates prescribed by the regulations made pursuant to the National Defence Act together with the allowances prescribed by the Canadian Forces Superannuation Regulations.

Pensionable Service

The amount of any annuity, cash termination allowance or annual 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 forces.

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

- (a) a period of full-time, paid employment in the Public Service,
- (b) a period of service as a member of the Royal Canadian Mounted Police,
- (c) a period of service
 - (i) on active service during time of war in the naval, army or air forces of Her Majesty raised by Canada,
 - (ii) in the Canadian Army Special Force established in 1950,
 - (iii) of six months or more in the naval, army or air forces of Her Majesty raised by Canada, other than the forces, provided that such service was full-time and continuous,
 - (iv) in the naval, army or air forces of Her Majesty other than those raised by Canada, provided that such service was full-time service during time of war or, otherwise, was full-time service in the permanent forces, and
- (d) one-fourth of a period of service in the naval, army or air forces of Her Majesty raised by Canada, other than the forces, during which the contributor was liable to be called out for periodic training or duty otherwise than during an emergency.

Service in the forces

The length of a contributor's "service in the forces" together with the circumstances of his termination of service govern the type of benefit payable to him or to his dependants.

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For most purposes, "service in the forces" means service in the regular forces of the Canadian Forces. However, for the purpose of computing the length of service in the forces of a contributor who dies leaving dependants entitled to benefit or who is compulsorily retired either because of disability or, in some circumstances, to promote economy or efficiency, certain types of elective service are prescribed by the Act as "service in the forces" in addition to service in the regular forces. Such additional "service in the forces" consists of any periods of elective pensionable service described in items (a), (b) and (c)(i), (ii) and (iii) of the preceding section with the proviso that the service described in item (c)(iii) must have been in a theatre of active operations.

Summary of Benefits (as they were on December 31, 1965)

A. Contributors who are members of the forces

<u>Type of Termination</u>	<u>Service in the Forces</u>	<u>Benefit</u>
Retirement because of age (Note 1).	3 years or less.	Return of contributions (Note 2).
	More than 3 years but less than 10 years.	Return of contributions or cash termination allowance (Note 3), whichever is the greater.
	10 years or more.	Annuity (Note 4).
Compulsory retirement because of disability.	Less than 10 years.	Return of contributions or cash termination allowance, whichever is the greater.
	10 years or more.	Annuity.
Compulsory retirement to promote economy or efficiency.	3 years or less.	Return of contributions.
	More than 3 years but less than 10 years.	Return of contributions or cash termination allowance, whichever is the greater.
	10 years or more but less than 20 years.	Annuity or reduced annuity (Note 5).
	20 years or more.	Annuity.
Compulsory retirement because of inefficiency.	Less than 10 years.	Return of contributions.
	10 years or more.	Annuity or reduced annuity (Note 6).
Compulsory retirement because of misconduct.	Less than 10 years.	Return of contributions.
	10 years or more.	Return of contributions or, in the discretion of the Treasury Board, annuity or reduced annuity (Note 7).
Voluntary retirement - officer contributors.	Less than 10 years.	Return of contributions.
	10 years or more but less than 25 years.	Return of contributions or, in the discretion of the Treasury Board, reduced annuity (Note 8).
	25 years or more.	Reduced annuity (Note 8).

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<u>Type of Termination</u>	<u>Service in the Forces</u>	<u>Benefit</u>
Voluntary retirement - contributors other than officers.	Less than 10 years.	Return of contributions.
	10 years or more but less than 20 years.	Return of contributions or, in the discretion of the Treasury Board, reduced annuity (Note 8).
	20 years or more but less than 25 years.	Reduced annuity (Note 8).
	25 years or more.	Annuity.
Death leaving no widow or children under age 18.	Any length.	Return of contributions.
Death leaving widow and/or children under age 18.	Less than 10 years.	Return of contributions or cash termination allowance, whichever is the greater.
	10 years or more.	Annual allowances to dependants. (Notes 9 and 10).

B. Contributors who are entitled to annuities
(including reduced annuities)

<u>Type of Termination</u>	<u>Benefit</u>
Death leaving no widow or children under age 18.	Return of excess contributions (Note 10).
Death leaving widow and/or children under age 18.	Annual allowances to dependants (Notes 10 and 11).

Note 1: "Retirement because of age" in this summary means ceasing to be a member of the forces at or after the prescribed retirement age applicable to the rank of the contributor for any reason other than disability, misconduct, or death.

Note 2: "Return of contributions" means the return, without interest, of any amount paid by the contributor into the Account or paid into any other account or fund and transferred to the Account.

Note 3: "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 forces.

Note 4: An "annuity" is ordinarily payable in equal monthly instalments beginning at retirement and continuing until the end of the month in which the contributor dies. 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 to the credit of the contributor up to a maximum of 35. The six-year period may consist of consecutive periods of pensionable service totalling six years.

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Note 5: A contributor who is compulsorily retired to promote economy or efficiency with 10 years or more but less than 20 years of service in the forces is entitled

- (a) in the case of a contributor who served on active service in World War II, who was not in the forces on June 1, 1944, and who became a member of the forces before 1949, to an annuity,
- (b) in the case of any other contributor,
 - (i) if retirement is due to a reduction in the total number of members of the forces, to an annuity, reduced, until age 65, by 5% for each full year not exceeding six by which the period of his service in the forces is less than 20 years, and
 - (ii) if retirement is due to some other reason, to an annuity, reduced by one-third until age 65, or, in the discretion of the Treasury Board, to a reduced annuity as described in (i) above.

Note 6: A contributor who is compulsorily retired because of inefficiency with 10 or more years of service in the forces is entitled to

- (i) an annuity, reduced by one-half until age 65, and thereafter by one-third, or
- (ii) in the discretion of the Treasury Board, the whole or any part of the annuity or reduced annuity to which he would have been entitled if he had been compulsorily retired from the forces to promote economy or efficiency due to a reduction in the total number of members of the forces, except that the amount of such annuity cannot be less than the amount of the annuity described in (i) above.

Note 7: A contributor who is compulsorily retired because of misconduct with 10 or more years of service in the forces may, in the discretion of the Treasury Board, be granted the whole or any part of the annuity or reduced annuity to which he would have been entitled if

- (i) in the case of a contributor who has reached retirement age, he were retired because of age, or
- (ii) in the case of a contributor who has not reached retirement age, he were compulsorily retired from the forces to promote economy or efficiency due to a reduction in the total number of members of the forces,

except that the capitalized value of such 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 8: For a contributor who retires voluntarily, not having reached retirement age, "reduced annuity" means

- (a) in the case of an officer contributor with 10 or more years of service in the forces or in the case of a contributor other than an officer with 10 years or more but less than 20 years of service in the forces, an annuity, reduced by 5% for each full year by which his age at time of retirement is less than the retirement age applicable to his rank, and

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- (b) in the case of a contributor other than an officer with 20 years or more but less than 25 years of service in the forces, an annuity, reduced by 5% for each full year by which the period of his service in the forces is less than 25 years.

Note 9: "Annual allowance" to the widow of a contributor means one-half of the annual amount of annuity computed as described in Note 4. This is termed the "basic allowance". If a widow remarries, her allowance is suspended. If the age of a contributor exceeds that of his widow by more than twenty years, the widow's allowance is reduced.

"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 such annual allowances may not exceed four-fifths of the basic allowance, or, if there is no living widow, eight-fifths of the basic allowance.

In the event that a contributor dies within five years after his marriage, dependants' allowances are reduced if the Treasury Board is not satisfied that anticipation of impending death was not a consideration affecting the agreement to marry.

Note 10: 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 11: The annual allowances to which dependants become entitled on the death of a person entitled to an annuity payable out of the Account are computed in the manner and subject to the conditions described in Note 9. However, a widow who married a person of age 60 or over after he became entitled to an annuity payable out of the Account is not entitled to an annual allowance unless such person subsequently became a member of the forces. 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 payable out of the Account is not entitled to an annual allowance unless

- (a) such person subsequently became a member of the forces, 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 forces, whichever is the later.

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Contributions (as they were on December 31, 1965)

By Contributor -

(a) Current Service

The rate of contribution for all contributors was 6% of pay. Contributions cease after a contributor has to his credit thirty-five 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, where 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 by him during that period of service together with simple interest at 4% per annum to the date of election.

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 Forces 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, 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 -

The Act and the relevant regulations provided that, at the end of each calendar quarter, there would be credited 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 specified by the Minister of Finance. (Since the Account was established in 1946, credits have been made at the rate of one and two-thirds times the total amount of contributions paid by contributors.)

The Act also provided that, after any pay increase of general application to the Forces, there would be credited to the Account such amount as the Minister of Finance deemed 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.

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II. The 1966 Amendments

Substantial modifications in the provisions of the Act as described above resulted from the amendments to the Act effected by the Statute Law (Superannuation) Amendment Act, 1966. The more important of these are outlined below.

1. Current and prior service contributions to the Account are reduced by the amount that the contributor is or would have been required to contribute under the Canada Pension Plan in respect of earnings deemed to have been received by him as a member of the forces. In general, annual current service contributions by contributors are less than would have formerly been the case by 1.8% of that portion of pay that falls between the Canada Pension Plan contributory earnings lower and upper limits. (For 1966 and 1967, these limits were \$600 and \$5,000, respectively; for 1968 the upper limit was raised to \$5,100.)

2. The amount of any annuity to which the contributor may become entitled under the Act is reduced by a portion of any disability or retirement pension concurrently payable to the contributor under the Canada Pension Plan; such portion is to be determined by reference to contributions made under the Canada Pension Plan in respect of the contributor's service as a member of the forces prior to completion of thirty-five years of pensionable service. The expression "any disability or retirement pension concurrently payable" is intended to include any such pension to which the contributor would have become entitled under the Canada Pension Plan if he had applied therefor and, in the case of a retirement pension, the amount of pension were not subject to the earnings test under the Canada Pension Plan.

3. The cash termination allowance payable to a contributor is reduced by any amount by which his contributions may have been reduced on account of co-ordination with the Canada Pension Plan as outlined in 1. above. However, the cash termination allowance payable to the widow and children of a contributor who dies with less than ten years of pensionable service is not so reduced.

4. The contribution basis for elections in respect of prior service in the Royal Canadian Mounted Police or the Public Service in respect of which no contributions were made to the Royal Canadian Mounted Police Superannuation Account or the Public Service Superannuation Account was changed. In the future, contributions will be based on the rate of pay applicable to the contributor on the most recent occasion on which he became a contributor under the Act. Formerly, contributions were based on the rate of pay applicable to the contributor during the period of such service.

5. Formerly, if the Treasury Board was not satisfied that anticipation of impending death was not a consideration affecting the agreement to marry, the annual allowance otherwise payable to the widow and children of a contributor was subject to a reduction if the contributor died within five years of his marriage. The stipulated percentage reduction, set at 100% for deaths within the first year of marriage, gradually decreased with increasing duration of marriage after the first year.

By virtue of the 1966 amendments, the only case in which the annuity is not payable is one where the contributor dies in the first year of marriage and the Minister of National Defence is not satisfied that the contributor, at the time of his marriage, had a reasonable expectation of surviving for at least one year thereafter.

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6. The Act, as it read on December 31, 1965, provided that as soon as possible following any general pay increase, there would be credited to the Account such amount as was deemed necessary to provide for the net increase in liability resulting from the increase. As the Act is presently constituted, an amount representing the increase in the net liability from a pay increase applicable to at least one per cent of the members of the forces shall forthwith be credited to the Account and the amount so credited shall be charged to the Consolidated Revenue Fund in five equal annual instalments commencing in the fiscal year in which the pay increase was authorized.

7. The 1966 amendments provide that, following the laying before Parliament of an actuarial report, "there shall be credited to the Superannuation Account such amount as, in the opinion of the Minister of Finance, together with the amount then to the credit of the said Account, is required to meet the cost of the benefits payable under Part I of the Act and the amount so credited shall be charged to the Consolidated Revenue Fund in five equal annual instalments commencing in the fiscal year in which the report is laid before Parliament". This provision is entirely new.

III. Description of Data and Membership Statistics

Data for contributors who were members of the forces on December 31, 1965, or who had ceased to be members of the forces during the period from January 1, 1961, to December 31, 1965, and for widows and children of contributors entitled to allowances some time between January 1, 1961 and December 31, 1965, were provided on punched cards by the integrated pension section of the three services. Certain supplementary data for persons entitled to annuities or annual allowances payable out of the Account on December 31, 1965, for the period from January 1, 1961, to December 31, 1965, were obtained from the pension section of the Treasury Office attached to the Department of National Defence. The electronic processing of the data and the required programming were arranged by the Central Data Processing Service Bureau.

For future valuations it is anticipated that most of the basic data will be provided by the Directorate of Automation of the Department of National Defence.

In the following tables are shown pertinent membership and termination statistics for the period from January 1, 1961, to December 31, 1965:

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A. Members of the Forces

Class of Contributors	Contributors on Jan.1/61	New Contributors Jan.1/61-Dec.31/65	<u>Terminations during period Jan.1/61-Dec.31/65</u>				Contributors on Dec.31/65	
			Type of Benefit	Type of Termination				
				Death	Disability	Other**	Total	
<u>Males:</u>								
Officers	16,740	4,334	Annuity	147	142	2,421	2,710	14,924
			Lump Sum	<u>53</u>	<u>73</u>	<u>3,314</u>	<u>3,440</u>	
Other Ranks	94,261	50,390	Annuity	495	1,778	4,629	6,902	88,075
			Lump Sum	<u>458</u>	<u>2,027</u>	<u>47,189</u>	<u>49,674</u>	
Total	111,001	54,724	Annuity	642	1,920	7,050	9,612	102,999
			Lump Sum	<u>511</u>	<u>2,100</u>	<u>50,503</u>	<u>53,114</u>	
				1,153	4,020	57,553	62,726	
<u>Females:</u>								
Officers	309	39	Annuity	1	6	62	69	193
			Lump Sum	<u>5</u>	<u>5</u>	<u>76</u>	<u>86</u>	
Other Ranks	2,790	2,070	Annuity	-	5	14	19	778
			Lump Sum	<u>7</u>	<u>93</u>	<u>3,963</u>	<u>4,063</u>	
Total	3,099	2,109	Annuity	1	11	76	88	971
			Lump Sum	<u>12</u>	<u>98</u>	<u>4,039</u>	<u>4,149</u>	
				13	109	4,115	4,237	
Grand Total	114,100	56,833	Annuity	643	1,931	7,126	9,700	103,970
			Lump Sum	<u>523</u>	<u>2,198</u>	<u>54,542</u>	<u>57,263</u>	
				1,166	4,129	61,668	66,963	

* In this column, cases of contributors who had other rank status on January 1, 1961, and who attained officer status at some time during the 1961-65 period are shown as officers rather than other ranks.

** Compulsory retirements because of age, promotion of economy or efficiency, inefficiency and misconduct, together with all voluntary retirements.

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B. Persons Entitled to Annuities or Annual Allowances

Retired Contributors

	Number Entitled on Jan.1/61	Number of New Entitlements Jan. 1/61 to Dec. 31/65	Terminations Jan.1/61 to Dec.31/65		Entitled on Dec.31/65**	
			Deaths	Other Term'ns*	No.	Monthly Average
<u>Males:</u>						
Retirement for reasons other than disability	1,850	7,050	238	38	8,624	\$216
Retirement because of disability	<u>361</u>	<u>1,920</u>	<u>82</u>	<u>0</u>	<u>2,199</u>	<u>145</u>
Total	2,211	8,970	320	38	10,823	\$202
<u>Females:</u>						
Retirement for reasons other than disability	14	76	1	0	89	\$183
Retirement because of disability	<u>3</u>	<u>11</u>	<u>0</u>	<u>0</u>	<u>14</u>	<u>141</u>
Total	17	87	1	0	103	\$177

* Re-enrollments in the forces and transfers to other superannuation plans.

** There were 402 "other than disability" and 10 "disability" cases whose annuities were wholly or partially suspended at December 31, 1965, because of employment in the Public Service; for these cases, the average amount of monthly annuity payable, assuming no suspension, was \$277, of which 81% was suspended. The relatively high average amount of annuity for these cases reflects the fact that two-thirds relate to retired officers. The average amounts shown in the schedule include "suspended" and all other reduced annuities at the full amounts ultimately payable.

Widows

Number Entitled on Jan.1/61	Number of New Entitlements Jan. 1/61 to Dec. 31/65	Terminations Jan.1/61 to Dec.31/65			Entitled on Dec.31/65	
		Deaths	Remarriages	Total	No.	Monthly Average
342	776	13	90	103	1,015	\$82

Children

Entitled on Jan. 1/61		Entitled on Dec.31/65	
No.	Monthly Average	No.	Monthly Average
694	\$12	1,712	\$15

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IV. Valuation Bases and Assumptions

1. General

Valuation tabulations for contributors who were members of the forces at the date of the current valuation and for contributors who had ceased to be members of the forces during the preceding five-year period were provided, separately, for male officers, male other ranks, female officers and female other ranks. Throughout the remainder of this report, the term "classes of active contributors" refers to these four groups.

As for preceding valuations of the plan, preliminary examination of the data showed significant differences in both salary and termination experience for the four classes of active contributors. It was, therefore, considered advisable to continue to treat each class separately for valuation purposes. Actual experience as revealed by the data exhibited differences in various areas from experience expected in accordance with the assumptions used for the 1960 valuation. However, the integration of the armed services which was in contemplation and in progress during the period under study brought with it changes in the level and incidence of retirements and incidence of promotion that are believed to be not indicative of future experience, and in general the 1960 valuation bases appeared reasonable for purposes of forecasting future experience. It was, therefore, considered appropriate and desirable to retain all the bases used in the 1960 valuation for the current valuation. In doing this, it was also possible to avoid obscuring the effect of the co-ordination of the Canadian Forces Superannuation Act and the Canada Pension Plan which became effective January 1, 1966.

2. Interest

The Canadian Forces 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. However, it is likely that the assumption of an interest rate of 4% per annum would have been retained, even if interest were not credited to the Account at this uniform rate, since this rate is considered to be a reasonable assumption as respects long term rates and, in addition, its retention facilitates comparisons between different periods and with other pension schemes. As in many private pension funds, it would be considered appropriate to use any earnings in excess of the valuation rate to alleviate the impact of increases in general levels of salaries to which reference will be made later in this report.

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

3. 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. Such prediction is necessary 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.

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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 promotion or at least by periodic increases in his pay. Such increases are hereinafter referred to as "promotional" increases. The second force stems from economic and social pressures such as increased productivity, inflation and collective bargaining. Increases in the general level of pay resulting from this force are hereinafter 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. Much less confidence can be placed on predictions of future increases in pay that depend on economic and social pressures. It is therefore usual in the valuation of pension plans under which pensions are related to final or final average 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 contributions on behalf of the employer in respect of new contributors. The result of this practice is that, assuming economic increases in pay between the dates of consecutive valuations, each valuation of a pension plan shows the creation of a new net liability in the inter-valuation period, unless there are offsetting gains to the pension fund from other sources, or unless special contributions are made in the inter-valuation period to reflect the additional net pension liability created by the economic increases in pay.

As noted earlier in this report, the 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 forthwith. 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 and acknowledges this responsibility by making required credits to the Account at the time of such increases. In the salary scales used for this valuation, therefore, only promotional increases in pay were taken into account.

The valuation data included the rate of pay authorized to be paid to each contributor on December 31, 1965. These data were classified in such manner that the average increase in pay from age to age could be studied for all contributors of the same age at beginning of pensionable service. From similar tabulations obtained for the valuation made as at December 31, 1960, salary scales had been constructed at that time for the four classes of active contributors. Although the data obtained for the current valuation did not entirely bear out the scales developed for the 1960 valuation, the scales were considered to remain reasonably appropriate. Additional comments regarding the experience with respect to salary increases will be found in Section VI.

In connection with the examination of the Account as at December 31, 1960, a special study was made to determine the effect of economic increases on the credits required to be made to the Account on behalf of the Government. For that purpose, "supplementary" salary scales were constructed on the assumption that, in addition to promotional increases, economic increases would occur at an annual rate of 2 $\frac{1}{2}$ %. It is interesting to note that in the inter-valuation period (January 1, 1961 to December 31, 1965) two general pay increases occurred which were equivalent to annual increases

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of approximately one and one-half per cent. However, when the period is extended to include the subsequent two years, three additional increases, made effective February 1, 1966, October 1, 1966 and October 1, 1967, produce an equivalent uniform annual rate of economic increase over the seven years ending December 31, 1967 of over $3\frac{1}{2}\%$ per annum. This compares to an effective rate of over $4\frac{1}{2}\%$ per annum which was experienced over the 10 years ending December 31, 1960. Comments regarding the effect of economic increases on contribution rates appear in Section V.

The salary scales used in the current valuation are shown in Appendix 1.

4. Rates of retirement with return of contributions

The experience rates of the 1961-65 period, when compared with the rates used in the 1960 valuation, were substantially higher for male officers and male other ranks below age 25, somewhat higher for officers between ages 25 and 34, and substantially lower for male other ranks above age 25. The rates used in the valuation are shown in Appendix 2.

5. Rates of retirement with entitlement to an annuity or cash termination allowance for reasons other than disability

For all members of the forces, retirement ages according to rank are prescribed by regulations made under the National Defence Act. With some exceptions, the retirement ages in effect on December 31, 1965 were as follows:

	<u>Royal Canadian Navy</u>	<u>Army & RCAF Non-Flying</u>	<u>RCAF Flying</u>
<u>Officers</u>			
Major-General and above	55	55	55
Brigadier-General	55	55	53
Colonel	55	53	51
Lieutenant-Colonel	50	51	49
Major	45	49	47
Captain	45	47	45
Lieutenant	45	45	45
<u>Other Ranks</u>			
Chief Warrant Officer	50	55	55
Master Warrant Officer	50	52	52
Warrant Officer and below	50	50	50

Notwithstanding the above ages, other ranks in the Royal Canadian Navy were retired not later than upon completion of twenty-five years of pensionable service.

The rates of retirement assumed for the 1960 valuation were based on the experience of the 1956-60 period for all classes except female officers, which were developed from the 1946-55 experience and considered to remain suitable. Those assumed rates reflected the impact of the retirement ages shown in the above table, modified to some extent by the effect of extensions beyond the prescribed retirement ages.

The experience of the 1961-65 period revealed a substantial number of retirements occurring earlier than expected in accordance with the rates assumed in the 1960 valuation. It is believed that this feature is mainly attributable to abnormally high rates of retirement being experienced during the period when integration and unification of the services was either in contemplation or in progress.

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Effective February 1, 1968, new retirement ages were adopted for contributors who commenced service after January 31, 1968, or who elected to come under the new regulations. These ages are shown in the following table:

	<u>General Service</u>	<u>Specialist Service</u>	<u>Commissioned from Ranks</u>
<u>Officers</u>			
Brigadier-General and above	55	60	55
Colonel	55	58	55
Lieutenant-Colonel	51	55	50
Major	47	55	50
Captain and Lieutenant	45	50	50
<u>Other Ranks</u>			
Sergeant and above		50	
Corporal and below		44	

Notwithstanding the above prescribed ages, for purposes of voluntary retirement or compulsory retirement under certain conditions, under the new regulations the retirement age will be deemed to have been reached upon completion of the following periods of full-time, paid service in any of Her Majesty's Forces:

	<u>Years of Service</u>
<u>Officers</u>	
Colonel and above	30
Lieutenant-Colonel and below	28
<u>Other Ranks</u>	
Sergeant and above	30
Corporal and below	25

Prior to the adoption of the new retirement regulations, estimates were made of the financial effect, as respects pensions, that might result from them. Those estimates indicated that there would not likely be any significant change in costs.

The rates used in the valuation are shown in Appendix 3.

6. Rates of retirement with entitlement to an annuity or cash termination allowance because of disability

For male officers, the experience rates of the 1961-65 period were fairly close to the rates developed from the experience of the 1956-60 period for use in the 1960 valuation but, for male other ranks, the experience rates of the 1961-65 period were substantially higher than the 1960 valuation rates which were developed from the experience of the 1956-60 period.

For female officers and female other ranks, the experience of the 1961-65 period indicated that the rates of retirement used for the 1955 and 1960 valuations continued to be suitable for the current valuation.

The rates used for the four classes of active contributors in the current valuation are shown in Appendix 4.

For purposes of estimating the effect of the provisions of the Statute Law (Superannuation) Amendment Act, 1966, it was assumed that one-half of the contributors becoming entitled to annuities would be considered disabled for purposes of the Canada Pension Plan.

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7. Rates of mortality and remarriage

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

- (a) the four classes of active contributors;
- (b) retired contributors entitled to annuities for reasons other than disability, males and females separately;
- (c) retired contributors entitled to annuities because of disability, males and females separately;
- (d) widows of deceased contributors;
- (e) children of deceased contributors.

Since widows' allowances are suspended on remarriage, rates of remarriage were needed for their valuation.

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

(a) Active contributors

For male officers and male other ranks, the mortality rates used in the 1960 valuation were developed from the experience of the 1956-60 period. For male officers, the mortality experienced during the 1961-65 period was fairly close to that expected on the basis of the rates used in the 1960 valuation. On the other hand, for male other ranks, the 1961-65 experience suggested that there might be a slight margin in the rates used for the 1960 valuation.

For female officers and female other ranks, the rates of mortality used were the female rates of the α -1949 Table Projected 10 Years.

The male and female rates used in the valuation are shown in Appendix 5.

(b) Contributors entitled to annuities for reasons other than disability

The mortality rates used in the valuation both for contributors entitled to annuities for reasons other than disability at the date of valuation and for those who would become so entitled after that date were the male and female rates, as applicable, of the α -1949 Table Projected 10 Years. The experience of the 1961-65 period indicated that these bases continued to be appropriate.

The male and female rates of the α -1949 Table Projected 10 Years and annuity values based thereon are shown in Appendix 6.

(c) Contributors entitled to annuities because of disability

For the 1960 valuation, a preliminary study of the experience of male contributors who had become entitled to annuities because of disability from the inception of the plan in 1946 to December 31, 1960 indicated that the mortality of male "disability" annuitants for this plan is relatively

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heavy during the first two years after retirement and is fairly normal thereafter. Further studies indicated that, as respects both male contributors entitled to annuities because of disability at the date of valuation and those who would become so entitled after that date, the mortality of contributors who survive at least two years after the date of retirement may be suitably represented for valuation purposes by the male rates of the Canadian Life Table, 1950-52, and the mortality of contributors within the first and second years after the date of retirement may be suitably represented by 300% and 200%, respectively, of those basic rates. Accordingly those bases were used for purposes of the 1960 valuation.

The experience of the 1961-65 period indicated the possibility that future mortality rates experienced among male contributors entitled to annuities because of disability might be substantially higher than the rates adopted for the 1960 valuation.

For males, the valuation rates applicable during the first year after date of retirement, those applicable after at least two years have elapsed from date of retirement, annuity values applicable at date of retirement and annuity values applicable after at least two years have elapsed from the date of retirement are all shown in Appendix 7.

For the whole 1946-65 period, only fourteen females became entitled to annuities because of disability and no deaths occurred among this group. The rates of mortality used in the valuation (which are simple modifications of the Canadian Life Table, 1950-52) and annuity values based thereon are shown in Appendix 7.

(d) Widows

The mortality basis used for the valuation of both present and prospective widows' allowances was a table of aggregate mortality rates derived from the 1948-57 experience of widows entitled to allowances under the Public Service Superannuation Plan. The remarriage basis was a table of select and ultimate remarriage 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. While this remarriage table was the most appropriate one available, tests indicated that the select rates of the table at the early durations are somewhat lower than corresponding actual rates for widows entitled to allowances under the Canadian Forces Superannuation Plan.

In Appendix 8 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.

(e) Children

Payments of 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.

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8. Proportions of male contributors leaving dependants at death

These proportions were needed in the valuation of prospective benefits to dependants who become entitled to an annual allowance on the death of officers, other ranks or retired contributors entitled to annuities.

The proportions used in the 1960 valuation were based on the combined experience of the three classes during the 1956-60 period. The experience of the 1961-65 period, although exhibiting some variations from the 1960 valuation basis, reflected that basis very closely for all ages combined. The proportions used for the valuation are shown in Appendix 9.

9. Average ages of widows corresponding to ages of contributors at death

These average ages were needed in the valuation of prospective benefits to widows who become entitled to an annual allowance on the death of their contributor husbands, whether active or retired.

The experience of the 1961-65 period indicated the continuance of a slow trend to smaller differences between the ages of husbands and wives. The average ages used in the valuation are shown in Appendix 9.

10. Proportion of contributors whose pay is less than the contributory earnings upper limit of the Canada Pension Plan; and Ratios of the average pay of such contributors to the contributory earnings upper limit

These proportions and ratios were required for purposes of determining the effect that the co-ordination of the Canadian Forces Superannuation Act and the Canada Pension Plan, effective January 1, 1966, would have on the balance sheet as well as on the rates of required Government credits to the Account. Suitable factors were developed from the statistics of contributors on December 31, 1965. They are shown in Appendix 10.

11. Capitalized values of benefits

In Appendix 11 are shown the values of benefits, per \$1.00 of "earned" annuity, emerging

- (a) on retirement with entitlement to an annuity for a reason other than disability,
- (b) on retirement with entitlement to an annuity because of disability, and
- (c) on death leaving dependants with entitlement to annual allowances.

For retirements, the values shown for male contributors include provision for prospective annual allowances to a widow and children and for the "minimum return" of an aggregate amount of benefit equal to the contributor's total contributions without interest; the values shown for female contributors include provision for the "minimum return" benefit.

For deaths, values are shown separately for the annual allowance benefits to the widow and the children and for the "minimum return" benefit.

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V. Required Rates of Contributions and Government Credits

In accordance with the provisions of the Act in effect on December 31, 1965 contributions payable by contributors for current service were equal to 6% of pay, and contributions for periods of prior service were, in the usual case, based on 6% of the pay received by electing contributors during such periods. Also, from commencement of the plan in 1946, credits equal to one and two-thirds of total current service and prior service contributions by contributors have been made to the Account on behalf of the Government. Thus, total credits to the Account have ordinarily been made at the rate of 16% of pay received by contributors during any period of pensionable service.

As indicated earlier in this report, it was deemed appropriate to estimate the credits to the Account required to be made on behalf of the Government in respect of new contributors to provide for the benefits under the Act, taking into account only promotional increases in pay. Accordingly, the rates shown below in Schedule A were calculated using the salary scales shown in Appendix 1 which give effect to promotional increases only.

Also, as indicated earlier in this report, it was deemed essential to estimate the effect of the provisions of the Statute Law (Superannuation) Amendment Act, 1966, on the credits to the Account required to be made in respect of new contributors on behalf of the Government. Accordingly the rates shown below in Schedule B were calculated, using the same basic assumptions implicit in the rates in Schedule A together with the necessary subsidiary assumptions as described in parts 6. and 10. of Section IV above.

The schedules show the rates at which credits on behalf of the Government are estimated to be required in respect of persons becoming contributors at ages 18, 20 and 22 and the average rates estimated to be required in respect of new contributors for each of the four classes of active contributors and for all classes combined. The average rates for each class of contributors were calculated by weighting the rates for individual ages by factors that involved the number, pay and pertinent annuity value of persons who became contributors of that class during the period from January 1, 1961, to December 31, 1965 (in Appendix 12 is shown the distribution of new contributors by age and class); the average rates for all contributors were calculated by applying similar weighting factors to the average rates for the four classes of contributors.

A special study made in connection with the 1960 valuation indicated that the component of the combined rate of contributions and Government credit required to provide benefits payable to the dependants of male contributors is equivalent to 2.5% of pay for officers, 1.3% of pay for other ranks and 1.8% of pay for all active male contributors.

A further study made in connection with the 1960 valuation, on the assumption of the "supplementary salary scales" mentioned in part 3 of Section IV above, indicated that to provide for economic increases in pay of $2\frac{1}{2}\%$ per annum in addition to normal promotional increases would require additional credits to the Account of approximately 5% of pay.

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Credits to the Account required on behalf of the Government
in respect of New Contributors (percentages of pay)

Schedule A

Applicable on December 31, 1965
(Prior to Canada Pension Plan Co-ordination)

	<u>Age at Becoming Contributor</u>			<u>Weighted Average</u>
	<u>18</u>	<u>20</u>	<u>22</u>	
<u>Males</u>				
Officers	16.71	16.92	16.93	17.0
Other Ranks	5.79	6.94	8.15	6.5
<u>Females</u>				
Officers	4.50	5.43	6.63	12.7
Other Ranks	(0.25)	(0.08)	0.16	(0.1)

For all classes combined, the average rate at which credits to the Account were estimated to be required under these conditions was 8.32% of pay. This is less than had been estimated in the preceding valuation because of a reduction in the average age at becoming a contributor for male other ranks and to a lesser extent because of a similar reduction for male officers.

Schedule B

Applicable on January 1, 1966
(After Canada Pension Plan Co-ordination)

	<u>Age at Becoming Contributor</u>			<u>Weighted Average</u>
	<u>18</u>	<u>20</u>	<u>22</u>	
<u>Males</u>				
Officers	16.29	16.50	16.74	16.7
Other Ranks	5.82	6.90	8.12	6.5
<u>Females</u>				
Officers	4.40	5.39	6.56	12.3
Other Ranks	(0.17)	0.01	0.27	0.0

For all classes combined the average rate at which credits to the Account are estimated to be required under these conditions is 8.26% of pay.

The fact that for practical purposes the total rate of required credit on behalf of the Government is the same in Schedules A and B indicates that the effect of co-ordination of the Canadian Forces Superannuation Account and the Canada Pension Plan has been to leave the cost to the Government of benefits payable pursuant to the Canadian Forces Superannuation Act unchanged. (In addition, of course, the Government is required to make contributions to the Canada Pension Plan which are approximately equivalent to 1.3% of pay under conditions prevailing about the time of the current valuation.)

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The effective average rate of contributions (after 1965) by all contributors to the Canadian Forces Superannuation Account was estimated to be 4.7% of pay (6% less contributions of approximately 1.3% to the Canada Pension Plan).

If credits to the Account on behalf of the Government are to be continued to be expressed as a multiple of contributions from contributors, a multiple of approximately one and four-fifths would be necessary to produce a credit of 8.3% of pay, the rate of Government credits estimated to be required to provide future benefits for new contributors. However, in view of a substantial degree of uncertainty as respects future experience in a number of areas, it would seem reasonable, at least until the next actuarial examination, to set the rate at which credits will be made to the Account on behalf of the Government at twice the total contributions paid by contributors. This would produce credits approximately equal to 9.4% of pay which, it may be noted, is somewhat less than the 10% rate that has been in effect since the inception of the Superannuation Plan in 1946.

VI. Valuation Balance Sheet and Observations

The balance sheet set out below summarizes the results of the valuation and shows the financial status of the Account as at December 31, 1965, on the basis of the assumptions described in Section IV.

In the construction of the balance sheet it was assumed that contributions to the Account by contributors in respect of service after December 31, 1965 would continue to be made at the rate of 6% of pay, that normal credits to the Account on behalf of the Government would equal one and two-thirds times total contributions by contributors and that special credits to the Account would be made on behalf of the Government equivalent to the net liability created in respect of any general increases in pay.

The conditions on which the balance sheet was based were those under which the Account operated on December 31, 1965. As noted earlier, important changes resulted from the enactment of the Statute Law (Superannuation) Amendment Act, 1966, which affected both contributions payable to the Account and benefits payable from it. The financial effect of those changes is discussed on the pages following the balance sheet.

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Valuation Balance Sheet as at December 31, 1965

Assets

Balance of Account		\$2,133,616,000
Outstanding credits from Government		14,601,000
Outstanding contributions from contributors		29,000
Present value of future contributions from contributors:		

Members of the forces

Current service

Males:-Officers	\$ 59,509,000	
Other ranks	202,661,000	
Females:-Officers	438,000	
Other ranks	<u>577,000</u>	\$263,185,000

Prior service

Males:-Officers	2,573,000	
Other ranks	4,288,000	
Females:-Officers	49,000	
Other ranks	<u>4,000</u>	6,914,000

Retired contributors

Males	1,559,000	
Females	<u>11,000</u>	<u>1,570,000</u>
		271,669,000

Present value of future credits from Government (assumed equal to 1 2/3 times contributions from contributors)		<u>452,782,000</u>
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Total Assets \$2,872,697,000

Deficit		<u>58,697,000</u>
		<u>\$2,931,394,000</u>

Liabilities

Present value of prospective benefits to contributors who are members of the forces:

Males:-Officers	\$ 823,776,000	
Other ranks	1,639,091,000	
Females:-Officers	7,290,000	
Other ranks	<u>2,559,000</u>	\$2,472,716,000

Present value of future benefits to persons entitled to an annuity or annual allowance:

Retired contributors:-Males	436,894,000	
Females	3,653,000	
Widows	15,517,000	
Children	<u>1,883,000</u>	457,947,000

Amounts due to retired contributors or to the dependants or estates of contributors		<u>731,000</u>
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Total Liabilities \$2,931,394,000

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The foregoing balance sheet indicates that there was an estimated deficit in the Account as at December 31, 1965 of \$58.7 million (or an amount equal to about two per cent of the value of all liabilities). This deficit may be almost entirely accounted for as an effect of the difference between the actual numbers of contributors released with return of contribution benefits and those expected to be released in the 1961-65 period in accordance with the rates assumed in the 1960 valuation. Other much smaller items of gain and loss were largely offsetting.

In addition to the deficit of \$58.7 million revealed by the foregoing balance sheet, it is essential to take account of the financial effect of the co-ordination of the Canadian Forces Superannuation Act with the Canada Pension Plan which, as described earlier, took effect on January 1, 1966. It is estimated that the effect of this co-ordination as of January 1, 1966 was

- (a) to reduce the value of benefits payable from the Account by \$115.8 million,
- (b) to reduce the value of future contributions from contributors by \$55.5 million, and
- (c) if normal credits to the Account on behalf of the Government should continue to be made at the rate of one and two-thirds times the amount of contributions from contributors, to reduce the value of future Government credits by \$92.5 million.

The combined effect of (a), (b) and (c) would be an increase of \$32.2 million in the balance sheet deficit so that the estimated effect of co-ordination would be to increase the estimated deficit on January 1, 1966 from \$58.7 million to \$90.9 million. (It is important to note that this estimated increase in the deficit of \$32.2 million would not represent an additional cost to the Government of this amount, since credits to the Account would be reduced by an offsetting amount two-thirds greater than contributions estimated to be made by the Government to the Canada and Quebec Pension Plans on behalf of contributors.)

If, as suggested in Section V above, normal credits to the Account on behalf of the Government after December 31, 1965 were to be at a rate twice the amount of contributions from contributors, the effect would be to reduce the balance sheet deficit as at January 1, 1966 from \$58.7 million to \$19.3 million. This amount would require adjustment depending on the date as of which the rate of credits to the Account were to be changed. For example, if credits to the Account equal to twice the amount of contributions from contributors were to be made beginning April 1, 1968, the effect of co-ordination on the Account as at January 1, 1966 may be assumed to have been to reduce the balance sheet deficit as at January 1, 1966 from \$58.7 million to \$36.9 million.

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VII. Conclusions

Having regard to the effect of co-ordination of the Canadian Forces Superannuation Act with the Canada Pension Plan, it appears desirable to change the rate at which credits to the Account are made on behalf of the Government from one and two-thirds to twice the amount of contributions paid into the Account by contributors. Whether or not this action is taken, in determining the amount to be credited to the Account in respect of the deficit disclosed by the examination of the Account, allowance should be made for the financial effect of co-ordination with the Canada Pension Plan in the manner indicated in the preceding section of this report.

In closing, it is a pleasure to acknowledge the co-operation of the contributing agencies of the Department of National Defence as well as that of the Central Data Processing Service Bureau.

Respectfully submitted,

W. Riese

W. Riese,
Chief Actuary.

March 15, 1968,
Department of Insurance,
O T T A W A.

VIII. A P P E N D I C E S

1. Salary Scales.
2. Rates of Retirement with return of contributions.
3. Rates of Retirement with entitlement to an annuity or cash termination allowance for reasons other than disability.
4. Rates of Retirement with entitlement to an annuity or cash termination allowance because of disability.
5. Rates of Mortality for active contributors.
6. Rates of Mortality for contributors retired for reasons other than disability and Annuity Values based thereon.
7. Rates of Mortality for contributors retired because of disability and Annuity Values based thereon.
8. Rates of Remarriage and Mortality for widows and Annuity Values based thereon.
9. Proportions of contributors leaving dependants at death;
and
Average ages of widows corresponding to ages of contributors at death.
10. Proportion of contributors whose pay is below the Contributory Earnings Upper Limit of the Canada Pension Plan;
and
Ratios of Average Salaries of such contributors to the Contributory Earnings Upper Limit.
11. Capitalized Values of benefits per \$1.00 "earned" annuity of contributors at retirement or death.
12. Age Distribution of members of the forces who became contributors during the period from January 1, 1961, to December 31, 1965.

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A P P E N D I X 1

Salary Scales

<u>Age</u>	<u>Males</u>		<u>Females</u>	
	<u>Officers</u>	<u>Other Ranks</u>	<u>Officers</u>	<u>Other Ranks</u>
15	.195	.335	.343	.340
16	.195	.340	.343	.346
17	.195	.346	.343	.353
18	.196	.354	.344	.362
19	.198	.366	.347	.375
20	.203	.384	.351	.394
21	.216	.409	.357	.421
22	.262	.448	.365	.456
23	.385	.491	.375	.495
24	.488	.531	.387	.536
25	.547	.566	.402	.577
26	.583	.596	.422	.616
27	.610	.621	.448	.651
28	.633	.643	.480	.682
29	.655	.664	.519	.709
30	.676	.684	.561	.733
31	.696	.702	.602	.755
32	.715	.719	.639	.776
33	.733	.735	.672	.796
34	.750	.750	.701	.815
35	.766	.764	.727	.833
36	.781	.778	.750	.849
37	.796	.792	.771	.863
38	.810	.806	.790	.876
39	.824	.819	.808	.888
40	.838	.831	.825	.899
41	.851	.843	.841	.909
42	.864	.855	.856	.918
43	.876	.867	.870	.927
44	.888	.879	.883	.935
45	.900	.891	.895	.942
46	.911	.902	.907	.949
47	.922	.913	.919	.956
48	.932	.924	.930	.962
49	.942	.935	.941	.968
50	.952	.946	.952	.974
51	.962	.957	.962	.980
52	.972	.968	.972	.985
53	.982	.979	.982	.990
54	.991	.990	.991	.995
55	1.000	1.000	1.000	1.000

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A P P E N D I X 2

Rates of Retirement with return of contributions

<u>Age at Retirement</u>	<u>Males</u>		<u>Females</u>	
	<u>Officers</u>	<u>Other Ranks</u>	<u>Officers</u>	<u>Other Ranks</u>
15	.1400	.0648	.0120	.0405
16	.1386	.0852	.0155	.0570
17	.1364	.1040	.0220	.0835
18	.1331	.1212	.0295	.1205
19	.1280	.1357	.0395	.1980
20	.1200	.1455	.0510	.2720
21	.1066	.1510	.0650	.2975
22	.0891	.1522	.0825	.3075
23	.0723	.1493	.1045	.3080
24	.0584	.1424	.1275	.3020
25	.0475	.1320	.1495	.2945
26	.0391	.1200	.1640	.2860
27	.0324	.1074	.1700	.2765
28	.0271	.0955	.1670	.2660
29	.0229	.0852	.1580	.2550
30	.0196	.0764	.1440	.2430
31	.0171	.0688	.1275	.2310
32	.0151	.0621	.1110	.2185
33	.0133	.0562	.0975	.2065
34	.0117	.0510	.0870	.1945
35	.0103	.0464	.0780	.1825
36	.0091	.0423	.0705	.1705
37	.0080	.0387	.0630	.1580
38	.0071	.0354	.0565	.1460
39	.0063	.0324	.0510	.1335
40	.0056	.0298	.0460	.1215
41	.0049	.0275	.0410	.1090
42	.0043	.0255	.0360	.0965
43	.0037	.0237	.0315	.0840
44	.0032	.0221	.0270	.0720
45	.0027	.0207	.0225	.0600
46	.0022	.0194	.0180	.0480
47	.0017	.0182	.0135	.0350
48	.0012	.0172	.0090	.0230
49	.0006	.0163	.0040	.0120
50	.0000	.0000	.0000	.0000

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A P P E N D I X 3

Rates of Retirement with entitlement to an annuity or cash
 termination allowance for reasons other than disability

<u>Age at Retirement</u>	<u>Males</u>		<u>Females</u>	
	<u>Officers</u>	<u>Other Ranks</u>	<u>Officers</u>	<u>Other Ranks</u>
18	.0006	.0037	.0010	.0015
19	.0010	.0032	.0010	.0015
20	.0016	.0029	.0011	.0016
21	.0023	.0026	.0012	.0016
22	.0033	.0024	.0013	.0016
23	.0047	.0022	.0014	.0017
24	.0067	.0021	.0015	.0017
25	.0095	.0020	.0016	.0018
26	.0130	.0020	.0016	.0019
27	.0107	.0020	.0017	.0020
28	.0085	.0020	.0018	.0021
29	.0068	.0020	.0019	.0023
30	.0055	.0021	.0020	.0024
31	.0046	.0022	.0021	.0025
32	.0039	.0023	.0022	.0026
33	.0034	.0024	.0023	.0028
34	.0030	.0026	.0024	.0030
35	.0027	.0028	.0025	.0032
36	.0024	.0031	.0026	.0034
37	.0022	.0034	.0028	.0037
38	.0020	.0037	.0030	.0040
39	.0018	.0040	.0032	.0043
40	.0017	.0044	.0035	.0047
41	.0016	.0049	.0038	.0051
42	.0015	.0054	.0042	.0056
43	.0015	.0059	.0047	.0061
44	.0014	.0065	.0052	.0066
45	.1000	.0071	.1000	.0072
46	.0500	.0078	.1000	.0078
47	.2000	.0085	.2000	.0084
48	.1500	.0093	.2000	.0091
49	.4000	.0101	.4000	.0100
50	.3000	.7000	.4000	.7000
51	.5000	.4000	.5000	.6000
52	.3000	.6000	.5000	.5000
53	.4000	.4000	.5000	.5000
54	.3500	.5000	.5000	.5000
55	1.000	1.000	1.000	1.000

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A P P E N D I X 4

Rates of Retirement with entitlement to an annuity or
cash termination allowance because of disability

<u>Age at Retirement</u>	<u>Males</u>		<u>Females</u>	
	<u>Officers</u>	<u>Other Ranks</u>	<u>Officers</u>	<u>Other Ranks</u>
15	.0034	.0052	.0012	.0000
16	.0034	.0052	.0012	.0000
17	.0034	.0052	.0013	.0005
18	.0034	.0051	.0013	.0022
19	.0034	.0050	.0014	.0039
20	.0033	.0048	.0015	.0048
21	.0032	.0046	.0015	.0054
22	.0030	.0043	.0016	.0057
23	.0028	.0040	.0017	.0058
24	.0026	.0037	.0018	.0056
25	.0024	.0034	.0019	.0053
26	.0022	.0032	.0020	.0049
27	.0019	.0030	.0021	.0041
28	.0017	.0029	.0022	.0035
29	.0015	.0028	.0023	.0032
30	.0013	.0028	.0024	.0031
31	.0012	.0028	.0025	.0030
32	.0011	.0028	.0027	.0031
33	.0010	.0028	.0029	.0031
34	.0010	.0029	.0031	.0032
35	.0010	.0030	.0033	.0034
36	.0010	.0031	.0035	.0035
37	.0011	.0033	.0037	.0037
38	.0012	.0035	.0039	.0039
39	.0014	.0037	.0041	.0041
40	.0016	.0039	.0044	.0044
41	.0019	.0042	.0047	.0047
42	.0022	.0046	.0050	.0050
43	.0025	.0051	.0054	.0054
44	.0028	.0056	.0058	.0058
45	.0032	.0061	.0062	.0062
46	.0036	.0067	.0067	.0067
47	.0041	.0074	.0073	.0073
48	.0046	.0081	.0079	.0079
49	.0052	.0088	.0085	.0085
50	.0058	.0095	.0092	.0092
51	.0065	.0102	.0100	.0100
52	.0072	.0110	.0108	.0108
53	.0080	.0118	.0117	.0117
54	.0088	.0126	.0126	.0126
55	.0096	.0134	.0136	.0136

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A P P E N D I X 5

Rates of Mortality for active contributors

<u>Age</u>	<u>Males</u>		<u>Females</u>
	<u>Officers</u>	<u>Other Ranks</u>	<u>(Officers and Other Ranks)</u>
15	.00049	.00049	.00025
16	.00065	.00065	.00026
17	.00083	.00084	.00028
18	.00104	.00104	.00030
19	.00128	.00122	.00031
20	.00154	.00136	.00033
21	.00183	.00145	.00035
22	.00215	.00151	.00037
23	.00248	.00153	.00039
24	.00279	.00151	.00042
25	.00304	.00147	.00044
26	.00320	.00141	.00047
27	.00326	.00134	.00050
28	.00321	.00128	.00053
29	.00307	.00124	.00056
30	.00284	.00122	.00060
31	.00255	.00121	.00064
32	.00221	.00121	.00068
33	.00192	.00122	.00073
34	.00168	.00125	.00078
35	.00152	.00129	.00083
36	.00145	.00134	.00089
37	.00145	.00141	.00096
38	.00151	.00151	.00103
39	.00162	.00163	.00111
40	.00178	.00178	.00120
41	.00198	.00198	.00129
42	.00222	.00222	.00140
43	.00250	.00250	.00151
44	.00282	.00282	.00164
45	.00318	.00318	.00178
46	.00360	.00360	.00194
47	.00407	.00407	.00211
48	.00459	.00459	.00230
49	.00516	.00516	.00251
50	.00577	.00577	.00274
51	.00642	.00642	.00296
52	.00711	.00711	.00321
53	.00782	.00782	.00349
54	.00855	.00855	.00380
55	.00931	.00931	.00415

A P P E N D I X 6

Rates of Mortality for contributors retired
 for reasons other than disability
 and
 Annuity Values based thereon

<u>Age at Retirement</u>	<u>Mortality Rate</u>		<u>Value of Annuity of \$1.00 per annum (interest at 4% per annum)</u>	
	<u>Males</u>	<u>Females</u>	<u>Males</u>	<u>Females</u>
45	.00320	.00178	\$17.205	\$18.658
46	.00363	.00194	16.929	18.418
47	.00411	.00211	16.649	18.171
48	.00463	.00230	16.364	17.917
49	.00519	.00251	16.075	17.655
50	.00578	.00274	15.782	17.386
51	.00642	.00296	15.486	17.110
52	.00709	.00321	15.186	16.826
53	.00780	.00349	14.883	16.533
54	.00854	.00380	14.576	16.233
55	.00932	.00415	14.265	15.925
56	.01013	.00454	13.950	15.609
57	.01099	.00497	13.631	15.285
58	.01188	.00546	13.308	14.953
59	.01282	.00601	12.980	14.613
60	.01383	.00662	12.648	14.267
61	.01493	.00732	12.311	13.913
62	.01615	.00811	11.970	13.552
63	.01750	.00899	11.625	13.185
64	.01899	.00998	11.276	12.812
65	.02065	.01110	10.924	12.434
66	.02248	.01235	10.569	12.051
67	.02451	.01376	10.213	11.663
68	.02676	.01534	9.855	11.271
69	.02924	.01712	9.497	10.877
70	.03199	.01911	9.138	10.480
71	.03503	.02135	8.781	10.081
72	.03840	.02386	8.425	9.682
73	.04211	.02667	8.071	9.282
74	.04621	.02983	7.720	8.884
75	.05074	.03336	7.372	8.487
76	.05574	.03732	7.029	8.094
77	.06126	.04176	6.691	7.704
78	.06734	.04672	6.359	7.318
79	.07404	.05227	6.034	6.938
80	.08141	.05847	5.715	6.565
81	.08952	.06540	5.404	6.199
82	.09843	.07313	5.102	5.842
83	.10821	.08175	4.809	5.494
84	.11893	.09134	4.525	5.156
85	.13068	.10202	4.251	4.830
86	.14352	.11387	3.987	4.514
87	.15755	.12701	3.734	4.211
88	.17282	.14153	3.492	3.921
89	.18936	.15751	3.262	3.645
90	.20721	.17502	3.044	3.382

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A P P E N D I X 7

Rates of Mortality for contributors retired
 because of disability
 and
Annuity Values based thereon

Age	Mortality Rate		Value of Annuity of \$1.00 per annum (interest at 4% per annum)	
	Males	Females	Males	Females
	Applicable during 1st year after retirement	Applicable after at least 2 years have elapsed from date of retirement	At date of retirement	After at least 2 years have elapsed from date of retirement
25	.00546	.00182	\$20.465	\$18.859
26	.00537	.00179	20.308	18.705
27	.00534	.00178	20.143	18.545
28	.00543	.00181	19.968	18.379
29	.00552	.00184	19.787	18.208
30	.00567	.00189	19.598	18.033
31	.00588	.00196	19.402	17.852
32	.00609	.00203	19.198	17.667
33	.00630	.00210	18.988	17.478
34	.00654	.00218	18.769	17.286
35	.00681	.00227	18.543	17.091
36	.00720	.00240	18.307	16.893
37	.00768	.00256	18.061	16.693
38	.00831	.00277	17.808	16.491
39	.00900	.00300	17.546	16.286
40	.00984	.00328	17.276	16.079
41	.01077	.00359	16.999	15.871
42	.01182	.00394	16.713	15.661
43	.01302	.00434	16.421	15.449
44	.01431	.00477	16.123	15.238
45	.01572	.00524	15.818	15.026
46	.01734	.00578	15.506	14.815
47	.01914	.00638	15.187	14.603
48	.02112	.00704	14.863	14.390
49	.02325	.00775	14.534	14.175
50	.02559	.00853	14.200	13.956
51	.02814	.00938	13.861	13.734
52	.03093	.01031	13.519	13.508
53	.03390	.01130	13.172	13.279
54	.03705	.01235	12.823	13.049
55	.04044	.01348	12.472	12.817
60		.02071		11.354
65		.03004		9.710
70		.04435		8.027
75		.06938		6.393
80		.10846		4.948
85		.16353		3.756
90		.23667		2.814

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A P P E N D I X 8

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	.148	.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

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A P P E N D I X 9

Proportions of Male Contributors leaving dependants at death
 and
 Average Ages of Widows corresponding to ages of
 contributors at death

<u>Age of Contributor at Death</u>	<u>Proportion of Male Contributors Leaving Dependents</u>	<u>Average Age of Widow</u>
25 $\frac{1}{2}$	.439	25.0
26 $\frac{1}{2}$	.542	25.9
27 $\frac{1}{2}$	.648	26.8
28 $\frac{1}{2}$	.721	27.7
29 $\frac{1}{2}$	.773	28.6
30 $\frac{1}{2}$	.811	29.5
31 $\frac{1}{2}$	.842	30.4
32 $\frac{1}{2}$	.867	31.3
33 $\frac{1}{2}$	.888	32.2
34 $\frac{1}{2}$	.905	33.1
35 $\frac{1}{2}$	.919	34.0
36 $\frac{1}{2}$	.931	34.9
37 $\frac{1}{2}$	.942	35.8
38 $\frac{1}{2}$	.952	36.7
39 $\frac{1}{2}$	.960	37.6
40 $\frac{1}{2}$	.967	38.5
41 $\frac{1}{2}$	.972	39.4
42 $\frac{1}{2}$	.976	40.3
43 $\frac{1}{2}$	.979	41.2
44 $\frac{1}{2}$	.981	42.1
45 $\frac{1}{2}$	.983	43.0
46 $\frac{1}{2}$	.984	43.9
47 $\frac{1}{2}$	.984	44.7
48 $\frac{1}{2}$	.983	45.6
49 $\frac{1}{2}$	.982	46.5
50 $\frac{1}{2}$	.980	47.4
51 $\frac{1}{2}$	.977	48.3
52 $\frac{1}{2}$	.972	49.2
53 $\frac{1}{2}$	.967	50.1
54 $\frac{1}{2}$	.961	51.0
55 $\frac{1}{2}$	.954	51.8
60 $\frac{1}{2}$	.907	56.2
65 $\frac{1}{2}$.840	60.5
70 $\frac{1}{2}$.751	64.7
75 $\frac{1}{2}$.640	68.7
80 $\frac{1}{2}$.513	72.6
85 $\frac{1}{2}$.379	76.1
90 $\frac{1}{2}$.250	78.8

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A P P E N D I X 10

Age	(A) Proportion of Contributors whose Pay is Below the Contributory Earnings Upper Limit of the Canada Pension Plan		(B) Ratio of Average Pay of Contributors in (A) to the Contributory Earnings Upper Limit of the Canada Pension Plan	
	<u>Officers</u>	<u>Other Ranks</u>	<u>Officers</u>	<u>Other Ranks</u>
15	1.000	1.000	.304	.401
16	1.000	1.000	.315	.408
17	1.000	1.000	.327	.420
18	1.000	1.000	.340	.466
19	.988	1.000	.354	.514
20	.968	1.000	.370	.565
21	.916	.996	.390	.618
22	.670	.986	.414	.677
23	.330	.972	.444	.741
24	.114	.948	.492	.796
25	.085	.914	.626	.838
26	.056	.860	.786	.868
27	.036	.706	.860	.889
28	.020	.566	.906	.903
29	.010	.494	.943	.913
30	.004	.440	.974	.921
31	.000	.398	1.000	.926
32		.356		.930
33		.320		.932
34		.288		.934
35		.259		.935
36		.234		.935
37		.210		.935
38		.190		.935
39		.172		.935
40		.155		.935
41		.140		.934
42		.126		.933
43		.113		.933
44		.101		.932
45		.090		.931
46		.080		.930
47		.071		.929
48		.063		.928
49		.054		.928
50		.047		.927
51		.040		.926
52		.032		.925
53		.026		.924
54		.020		.923
55		.015		.922

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A P P E N D I X 11

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

On Retirement with entitlement to an annuity
 for a reason other than disability

<u>Age of Contributor at Retirement</u>	<u>Males</u>	<u>Females</u>
35	\$20.748	\$20.719
40	19.807	19.793
45	18.697	18.707
50	17.431	17.448
55	16.012	16.003

On Retirement with entitlement to an annuity
 because of disability

<u>Age of Contributor at Retirement</u>	<u>Males</u>	<u>Females</u>
25	\$21.572	\$18.860
30	20.919	18.035
35	20.089	17.094
40	19.065	16.084
45	17.852	15.033
50	16.459	13.966

On Death leaving dependants entitled to
 annual allowances

<u>Age of Contributor at Death</u>	<u>Widow's Allowance</u>	<u>Children's Allowances</u>	<u>Minimum Return Benefit</u>	<u>All Benefits</u>
25	\$4.024	\$2.501	\$.041	\$6.566
30	5.668	2.427	.029	8.124
35	7.070	2.241	.022	9.333
40	7.940	1.733	.025	9.698
45	8.326	1.002	.036	9.364
50	8.297	.568	.051	8.916
55	7.978	.255	.070	8.303
60	7.469	.003	-	7.472
65	6.839	-	-	6.839
70	6.149	-	-	6.149
75	5.454	-	-	5.454
80	4.802	-	-	4.802
85	4.228	-	-	4.228
90	3.787	-	-	3.787

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A P P E N D I X 12

Number of members of the forces who became contributors
 during the period from January 1, 1961, to December 31, 1965,
 distributed by age and class

<u>Age at Becoming Contributor</u>	<u>Males</u>		<u>Females</u>	
	<u>Officers</u>	<u>Other Ranks</u>	<u>Officers</u>	<u>Other Ranks</u>
15	0	1	0	0
16	14	925	0	9
17	536	10,633	0	33
18	1,357	14,294	0	749
19	963	10,357	1	694
20	394	5,999	1	304
21	190	3,376	1	122
22	120	1,908	1	65
23	82	1,153	1	29
24	87	668	2	23
25	66	316	0	15
26	75	170	2	8
27	63	138	0	3
28	66	108	2	6
29	55	90	0	2
30	63	62	2	4
31	43	42	3	0
32	37	32	0	1
33	15	38	4	1
34	14	22	1	0
35	8	12	3	1
36	12	11	4	0
37	11	7	3	1
38	18	4	3	0
39	8	9	1	0
40	6	6	0	0
41	6	2	0	0
42	6	1	1	0
43	5	4	2	0
44	6	1	1	0
45	2	0	0	0
46	1	0	0	0
47	1	0	0	0
48	3	0	0	0
49	1	1	0	0
50	0	0	0	0
51	0	0	0	0
Total	4,334	50,390	39	2,070
Average Age	20.4	19.0	32.4	19.2