

Public Service Superannuation Act - Part I

Report on Actuarial Examination
of the
Superannuation Account in the Consolidated Revenue Fund
as at December 31, 1957

In accordance with instructions, we have completed an actuarial examination of the Superannuation Account in the Consolidated Revenue Fund and have the honour to report thereon.

Terms of the Superannuation Plan

Membership:

Persons covered by the Superannuation plan consist of

- (a) employees of the Public Service* other than
 - (i) employees who, on July 19, 1924, were subject to the provisions of the Retirement Act and did not subsequently elect to become contributors under the Civil Service Superannuation Act,
 - (ii) employees who, on December 1, 1931, were employed in the Mint and did not subsequently elect to become contributors under the Civil Service Superannuation Act,
 - (iii) temporary employees* with less than twelve months of service in the Public Service,
 - (iv) employees in receipt of salary at a rate less than \$900 per annum except those who were contributors under the Civil Service Superannuation Act immediately prior to January 1, 1954,
 - (v) employees engaged locally outside Canada, and
 - (vi) prevailing rate, seasonal or sessional employees who have not been designated by the Governor in Council as persons required to contribute to the Superannuation Account;
- (b) former employees of the Public Service who have become entitled to annuities or annual allowances payable out of the Superannuation Account; and
- (c) widows and children in receipt of annual allowances payable out of the Superannuation Account; these are dependents of contributors who died either in service or while entitled to an annuity or annual allowance.

Pensionable Service:

The amount of any annuity to which a contributor may become entitled under the Act depends upon the number of years of pensionable service to his credit at the date he ceases to be employed in the Public Service.

"Pensionable service" is described in detail in the Act. Very generally, the pensionable service of a contributor includes any period of service in the Public Service for which he has contributed or has elected

* As defined in the Public Service Superannuation Act.

to contribute and has been eligible to do so. It may also include

- (a) a period prior to April 14, 1927, during which the contributor was absent from the Public Service on leave of absence without pay,
- (b) one-half of a period of service in the Public Service before August 11, 1939, for which the contributor neither made nor elected to make contributions,
- (c) a period of service on active service in the forces during World War I or World War II,
- (d) a period of service with the regular forces, with the Royal Canadian Mounted Police Force or with an employer with whom a reciprocal transfer agreement has been effected,
- (e) a period of service with the Government of Newfoundland prior to the union of Newfoundland with Canada, and
- (f) a period of service in pensionable employment prior to becoming employed in the Public Service.

Benefits:

The benefit provisions of the Public Service Superannuation Act as at December 31, 1957, are summarized below:

Summary of Benefits

I. Contributors with less than five years of pensionable service (Note 1):

<u>Type of Termination</u>	<u>Benefit</u>
All types	Return of contributions (Note 2).

II. Contributors with five or more years of pensionable service:

(a) Contributors employed in the Public Service

<u>Type of Termination</u>	<u>Benefit</u>
Retirement because of age (Note 3)	Immediate annuity (Note 4).
Retirement because of disability (Note 3)	At option of contributor (i) immediate annuity, (ii) gratuity (Note 5), or (iii) return of contributions.
Ceasing to be employed for reasons other than age, disability, misconduct or death (Note 3)	At option of contributor (i) deferred annuity (Note 6), (ii) return of contributions, or (iii) with the consent of the Treasury Board, annual allowance (Note 7).
Dismissal because of misconduct	(i) Return of contributions, or (ii) with the consent of the Treasury Board, immediate annuity, deferred annuity or annual allowance (Note 8).
Death leaving no widow or children under age 18	Return of contributions to estate.
Death leaving widow and/or children under age 18	Annual allowance to widow and/or children (Notes 9 and 10).

(b) Contributors who have ceased to be employed in the Public Service:

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

- Note 1: Prior to the coming into force of the Public Service Superannuation Act on January 1, 1954, contributors under the Civil Service Superannuation Act were eligible for benefits other than a return of contributions upon ceasing to be employed in the Public Service with less than five years of pensionable service. This right was protected when such persons became contributors under the Public Service Superannuation Act. At December 31, 1957, therefore, there were still a number of contributors who would be eligible for benefits other than a return of contributions if they terminated service during 1958 with less than five years of pensionable service.
- Note 2: Return of contributions means return of a contributor's total current service and prior service contributions without interest.
- Note 3: Retirement because of age in this summary means ceasing to be employed in the Public Service at age 60 or over for any reason other than misconduct or death. It follows that "retirement because of disability" refers only to retirement before age 60, and "ceasing to be employed for reasons other than age, disability or death" refers only to ceasing to be employed before age 60.
- Note 4: 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 salary in respect of any selected ten year period of pensionable service multiplied by the number of years of pensionable service up to a maximum of 35. The ten year period may consist of consecutive periods of pensionable service totalling ten years. If a contributor has less than ten years of pensionable service, the average annual salary is based on salary in respect of his total pensionable service. If the rate of salary authorized to be paid to a contributor exceeded \$15,000 a year for any part of the period selected for the computation of average annual salary, the annual rate deemed to apply for that part of the period is \$15,000. The annuity is ordinarily payable in equal monthly instalments in arrears until the end of the month in which the contributor dies.
- Note 5: Gratuity in this summary means one month's pay for each year of pensionable service, not exceeding ten, at the rate of salary authorized to be paid to the contributor at the time, in the usual case, that he ceases to contribute to the Superannuation Account. If, at such time, the rate of salary authorized to be paid to the contributor exceeds \$15,000 a year, the annual rate deemed to apply is \$15,000.
- 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 4. 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: Annual allowance to a 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. The

annual allowance is 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 8: In the case of dismissal because of misconduct, the Treasury Board has the power to specify that the contributor become entitled to the whole or any part of the annuity or annual allowance to which he would have become entitled if he had ceased to be employed in the Public Service for a reason other than misconduct. However, the annuity or annual allowance cannot be reduced to the extent that its capitalized value, computed on the basis of the $a(f)$ and $a(m)$ Ultimate tables of mortality and interest at 4% per annum, is less than the contributor's own contributions.

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 the age of the contributor exceeds that of the widow by twenty or more years, the widow's allowance is reduced. If a contributor dies within five years after his marriage, the widow's allowance may be reduced if the Treasury Board is not 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 reached 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 reaches age 18. The total amount of 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. A child born to the widow of a contributor is not entitled to annual allowance unless the child was conceived before the death of the contributor.

Note 10: At the time that (a) a contributor dies leaving no widow and/or children entitled to allowance, or (b) a contributor's last dependent to whom an 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, or, if less than five hundred dollars, as authorized by the Treasury Board.

Note 11: The allowances payable are computed in the manner and subject to the conditions described in Note 9. However, the widow of a contributor is not entitled to an annual allowance if the contributor married after he became entitled to an annuity or annual allowance payable out of the Superannuation Account and did not subsequently become employed in the Public Service. Also, a child who was born to or adopted by a contributor or who became the stepchild of a contributor after the contributor ceased to be employed in the Public Service is not entitled to an annual allowance unless, in the case of a child born to a contributor, the child was conceived before the contributor ceased to be so employed.

Contributions:

By contributor -

(a) Current Service

The rates of contribution for contributors employed in the Public Service are - for males, 6% of salary,
for females, 5% of salary.

Contributions cease after a contributor has to his credit 35 years of contributory service. By contributory service is meant all pensionable service in respect of which contributions have been made or have been elected to be made as well as any period of absence from the Public Service on active service in the forces during World War I or World War II which is countable as pensionable service but for which contributions are not required.

Contributions are not made in respect of any amount received as salary at a rate in excess of \$15,000 a year.

(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 election for a period of pensionable service is made within one year after the employee 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 interest*. There are exceptions to this general rule. For example, the amount of contributions required from a contributor in respect of

- (i) active service in the forces in World War I or World War II where the contributor was not employed in the Public Service immediately prior to enlistment in the forces, or
- (ii) service in pensionable employment immediately prior to becoming employed in the Public Service,

is equal to twice the amount that would have been required in respect of a salary at the rate authorized to be paid to the contributor at the time he became employed in the Public Service subsequent to the period of prior service for which he has made election.

A contributor who fails to make an election for a period of pensionable prior service within one year after becoming a contributor may make election for that period of service at any time before he ceases to be employed in the Public Service if he is in good health at date of election. However, the amount of contributions required in respect of such period of service is equal to the amount that would have been required in respect of a salary 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. If a contributor, at date of election for a period of prior service, is age 45 or under, the monthly instalment period may not extend beyond age 65; if the contributor is over age 45, the monthly instalment period may not be longer than 20 years. Monthly instalments are computed

* Simple interest at 4% per annum from the middle of the fiscal year in which contributions would have been made, had the contributor been required to make those contributions during the period for which he elects to pay, until the time of making the election.

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 Government credits to the Superannuation Account

- (a) an amount estimated to be equal to the total of current service and prior service contributions paid by contributors during each fiscal year, and
- (b) at the end of each quarter, interest equal to 1% of the balance to the credit of the Account at the end of the preceding quarter.

After any salary increase of general application to the Public Service, the Government credits to the Superannuation 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 salary increase.

Changes in the Plan since December 31, 1947:

The last examination of the Superannuation Account was made as at December 31, 1947. From that date until December 31, 1953, benefits and contributions in respect of contributors to the Superannuation Account were based on the provisions of the Civil Service Superannuation Act, which had come into force in 1924. Effective January 1, 1954, the Civil Service Superannuation Act was replaced by the Public Service Superannuation Act.

The Public Service Superannuation Act created a new concept as respects the relationship between the Government and its employees who were contributors to the Superannuation Account. Under the Civil Service Superannuation Act, persons employed in the Public Service were considered as serving at pleasure and benefits to contributors and their dependents existed as a matter of grace, the Governor in Council being empowered to grant certain benefits to a contributor on termination of his employment in the Public Service and to the dependents of a contributor on his death. Under the Public Service Superannuation Act, benefits became a legal right of the contributor and his dependents. Thus, any dispute concerning either the interpretation or application of the provisions of the Public Service Superannuation Act may be taken to the courts.

Another very important change brought about by the Public Service Superannuation Act was the extension of coverage to large groups of employees of the Public Service who formerly were excluded from participation in the plan. Under the Civil Service Superannuation Act, only employees of the Public Service who were employed under permanent certificates or who were designated for purposes of the Act to have permanent status were deemed eligible to become contributors. Under the Public Service Superannuation Act, participation in the Superannuation plan became available to most persons employed in the Public Service. Any whole-time employee in a continuing position automatically becomes a contributor. Any person employed for a term of 12 months or less becomes a contributor either when transferred to a continuing position or at the end of 12 months, whichever is earlier. Any prevailing rate, seasonal or sessional employee becomes a contributor when so designated by the Governor in Council. Coverage was also extended to the employees of a number of boards, commissions, corporations and portions of the Public Service that formerly were not considered as part of the Public Service for purposes of the Superannuation plan. At the effective date of the Public Service Superannuation Act, the number of "employed" contributors increased by about 60,000 because of the changes in eligibility requirements.

The major change in the benefit structure under the new Act was the introduction of a "waiting period," namely, five years of pensionable service,

before a contributor or his dependents may become eligible for any benefit other than a return of contributions. There was no such requirement under the Civil Service Superannuation Act at the date of its repeal.

Other important changes introduced by the Public Service Superannuation Act are described below:

1. Under the Public Service Superannuation Act, provision was made for entering into agreements with "public service employers"* to enable the transfer of contributions and benefit rights with the change of employment of a contributor. At the date of this report, such agreements have been entered into with the Bank of Canada, the Government of the Province of British Columbia, Canadian Arsenals Limited, Canadian National Railway Company, Canadian National (West Indies) Steamships, Limited, Central Mortgage and Housing Corporation and the Corporation of the City of Ottawa.

2. Under the Public Service Superannuation Act, any amount to the credit of an employee in the Retirement Fund at the time he becomes a contributor to the Superannuation Account is automatically transferred to the Superannuation Account as a contribution in respect of his prior service. Under the Civil Service Superannuation Act, when an employee of the Public Service became a contributor, having previously made contributions to the Retirement Fund, he had the option of (a) taking a return of the amount to his credit in the Retirement Fund, namely, his contributions to the Retirement Fund with interest at 4% per annum thereon, or (b) electing to have that amount transferred to the Superannuation Account as a contribution in respect of his prior service.

3. The Public Service Superannuation Act provides that any period of active service in the forces during World War I or World War II may be counted as a period of pensionable service. Under the Civil Service Superannuation Act, only overseas service could be counted.

4. The Public Service Superannuation Act provides that election may be made for a period of pensionable service at any time before a contributor ceases to be employed in the Public Service. If, however, a contributor makes an election later than one year after he becomes a contributor, the amount of his prior service contributions for that period of service is computed on the basis of his annual salary rate at the time he makes the election. He must also pass a medical examination before such election becomes valid. Under the Civil Service Superannuation Act, a contributor could not elect for a period of pensionable service after one year from the date of his becoming a contributor.

5. Under the Public Service Superannuation Act as it was originally enacted, it was provided that a contributor could not make current service contributions after attainment of age 65, that service in the Public Service after age 65 could not be counted as pensionable service, and that salary received after age 65 could not be used in computing a contributor's average annual salary. These provisions were to have become effective on August 1, 1957, but they were repealed in 1956.

6. Under the Public Service Superannuation Act, it is provided that a contributor who ceases to be employed in the Public Service before attainment of age 60 for any reason other than disability, death or dismissal because of misconduct, and who has to his credit at that time five or more years of pensionable service, may, upon his request and with the consent of the Treasury Board, receive an annual allowance commencing immediately or at age 50 if his age at termination of service is under 50. Under the Civil Service Superannuation Act, this benefit was not available although there was provision for an annual

* By "public service employer" is meant a Crown corporation other than a Crown corporation specified as part of the Public Service for purposes of the Act, the government of a province or a municipality, the Bank of Canada, the government of any country other than Canada or any international organization designated by the Governor in Council for the purposes of this provision.

allowance, payable immediately, to a contributor who retired because of abolition of office with ten or more years of service in the Civil Service.

7. The maximum allowances to children were increased under the Public Service Superannuation Act. Under the Civil Service Superannuation Act, the amount of allowance payable to each eligible child was equal to one-fifth of the widow's allowance if there was a living widow or two-fifths of the widow's allowance if there was no living widow. These amounts also apply under the Public Service Superannuation Act. However, under the Civil Service Superannuation 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 Public Service Superannuation Act. Also, under the Civil Service Superannuation Act, total 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 Public Service Superannuation Act are 80% and 160% of the widow's allowance.

8. Under the Public Service Superannuation Act, the rate of contribution for current service is 6% of salary for all male contributors and 5% of salary for all female contributors. Under the Civil Service Superannuation Act, the rates of contribution for current service were

- (a) 5% of salary for
 - (i) all female contributors,
 - (ii) male contributors who were contributors prior to August 11, 1939, and
 - (iii) male contributors in receipt of salary at a rate of \$1200, or less, per annum;
- (b) 5½% of salary for male contributors in receipt of salary at a rate between \$1200 and \$1500 per annum, except that, after deduction of contributions, salary could not be less than \$1140 per annum, and
- (c) 6% of salary for all other male contributors, except that, after deduction of contributions, salary could not be less than \$1117.50 per annum.

Data

Data for the valuation were collected by the Superannuation Branch of the Department of Finance on forms designed for the purpose. From these data, Central Pay Office built up punched card files for

- (a) contributors employed in the Public Service on December 31, 1957,
- (b) contributors who ceased to be employed in the Public Service between January 1, 1948, and December 31, 1957, inclusive,
- (c) contributors entitled to an annuity or annual allowance on December 31, 1957,
- (d) contributors entitled to an annuity or annual allowance who died or became re-employed in the Public Service between January 1, 1948, and December 31, 1957, inclusive,
- (e) widows of deceased contributors entitled to an annual allowance on December 31, 1957,
- (f) widows of deceased contributors who ceased to be entitled to an annual allowance by reason of death or remarriage between January 1, 1948, and December 31, 1957, inclusive, and
- (g) children of deceased contributors entitled to an annual allowance on December 31, 1957.

From the completed punched cards the Dominion Bureau of Statistics computed ages and durations and made the sortings and tabulations of the data as required for the valuation of benefits and contributions and for ancillary investigations.

Tabulations of data for contributors employed in the Public Service on December 31, 1957, and for contributors who ceased to be employed in the Public Service during the period from January 1, 1948, to December 31, 1957, were provided, separately for males and females, for

- (a) whole-time employees,
- (b) prevailing rate employees, and
- (c) seasonal (including sessional) employees.

Tabulations of data for persons entitled to an annuity or annual allowance on December 31, 1957, were provided for

- (a) male contributors,
- (b) female contributors,
- (c) widows of deceased contributors, and
- (d) children of deceased contributors.

Also, tabulations of data were provided, separately, for male and female contributors and for widows of deceased contributors who ceased to be entitled to an annuity or annual allowance during the period from January 1, 1948, to December 31, 1957.

In the following tables are shown pertinent statistics derived from the tabulations of the data for the period from January 1, 1948, to December 31, 1957:

Contributors Employed in the Public Service

	Contributors on Jan. 1, 1948	Employees who became contributors Jan. 1, 1948 - Dec. 31, 1957	Contributors who ceased to be employed Jan. 1, 1948 - Dec. 31, 1957				Contributors on Dec. 31, 1957
			(1) Age	(2) Disability	Death	(3) Other	
<u>Males</u>							
Whole-time	29,218	124,349	10,039	1,558	3,564	31,905	106,501
Prevailing Rate	1,644	6,776	686	68	238	631	6,797
Seasonal	665	560	175	22	87	68	873
Total	31,527	131,685	10,900	1,648	3,889	32,604	114,171
<u>Females</u>							
Whole-time	4,322	70,972	1,296	663	308	31,449	41,578
Prevailing Rate	42	392	26	9	3	48	348
Seasonal	19	85	6	2	0	25	71
Total	4,383	71,449	1,328	674	311	31,522	41,997
Grand Total	35,910	203,134	12,228	2,322	4,200	64,126	156,168

- (1) Contributors who retired with entitlement to an immediate annuity at age 60 or over.
- (2) Contributors who ceased to be employed at ages under 60 because of disability (the benefit received may have been an immediate annuity, gratuity or return of contributions).
- (3) Contributors who ceased to be employed at ages under 60 for reasons other than death or disability and those who ceased to be employed at age 60 or over for reasons other than death or retirement with entitlement to an immediate annuity.

Persons Entitled to an Annuity or Annual Allowance

Contributors

	Entitled Jan. 1, 1948	Who became entitled Jan. 1, 1948 - Dec. 31, 1957	Who ceased to be entitled Jan. 1, 1948 - Dec. 31, 1957		Entitled Dec. 31, 1957		Total
			Death	Re-employment	In payment	Deferred	
<u>Males</u>							
Retirements for reasons other than disability	4,600	11,710	3,927	59	11,739	585	12,324
Retirements because of disability	<u>2,396</u>	<u>1,318</u>	<u>1,225</u>	<u>3</u>	<u>2,486</u>	-	<u>2,486</u>
Total	6,996	13,028	5,152	62	14,225	585	14,810
<u>Females</u>							
Retirements for reasons other than disability	441	1,693	253	32	1,528	321	1,849
Retirements because of disability	<u>454</u>	<u>355</u>	<u>137</u>	<u>16</u>	<u>656</u>	-	<u>656</u>
Total	895	2,048	390	48	2,184	321	2,505
Grand Total	7,891	15,076	5,542	110	16,409	906	17,315

Widows

Entitled Jan. 1, 1948	Who became entitled Jan. 1, 1948 - Dec. 31, 1957	Who ceased to be entitled Jan. 1, 1948 - Dec. 31, 1957		Entitled Dec. 31, 1957
		Death	Remarriage	
3,664	6,208	1,574	258	8,040

Children

Entitled
Dec. 31,
1957
1,521

Valuation Bases and Assumptions

General

Preliminary examination of the data showed that few contributors become employed in the Public Service at ages older than 65 and that few contributors remain employed in the Public Service at ages older than 71. It was therefore assumed, where necessary for valuation purposes, that the maximum age of contributors at beginning of pensionable service is age 65, and that all contributors employed in the Public Service at age 70 cease to be so employed in the following year of age.

In the initial stages of the actuarial studies,

- (a) from the experience of whole-time contributors with five or more years of pensionable service, rates of termination because of death, age retirement, disability retirement, and ceasing to be employed for other reasons were calculated, and
- (b) from the experience of all whole-time contributors salary scales were constructed.

These rates and salary scales were then applied to appropriately scheduled data for prevailing rate and seasonal contributors and the results compared with the actual experience of those groups. The tests revealed that

- (a) the rates of termination for whole-time contributors with five or more years of pensionable service at termination were suitably representative of the experience for all prevailing rate and seasonal contributors for valuation purposes, and
- (b) the salary scales for whole-time contributors were very different from the salary patterns for prevailing rate and seasonal contributors and, thus, could not be used in the valuation for the latter two groups.

In references to rates of termination in the remainder of this report, the terms "aggregate," "select" and "ultimate" are used from time to time. In this connection,

- (a) "aggregate" means rates, classified by age only, derived from all the experience of the group being studied without regard to number of years of pensionable service,
- (b) "select" means rates, classified by age at beginning of pensionable service and by number of complete years elapsed since that age, derived from the experience covering the first few years of pensionable service of the group being studied, and
- (c) "ultimate" means rates, classified by age only, derived from all the experience of the group being studied except that covering the years of pensionable service for which select rates have been determined.

1. Interest

The Public Service Superannuation Regulations provide that interest shall be credited to the Superannuation 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.

Salary Scales

It was necessary to determine the rates at which salary will, on the average, increase from age to age in the future. This information was required for the following reasons:

- (a) annuity benefits depend, in the usual case, upon the average salary received during a selected ten year period of pensionable service (ordinarily, the period selected is the last ten years of service);
- (b) the gratuity benefit depends upon the rate of salary authorized at termination of service; and
- (c) future current service contributions depend upon salary received during future years of service.

The valuation data included the rate of salary authorized to be paid to each contributor employed in the Public Service on December 31, 1957. These data were classified in such manner that the average increase in salary from age to age could be studied for all persons of the same age at beginning of pensionable service.

From these and other relevant data, salary scales were determined for male whole-time contributors, female whole-time contributors and male prevailing rate and seasonal contributors combined. For female prevailing rate and seasonal contributors, studies of the data revealed that there was little variation in level of salary according to age. Consequently, for these two female groups, no salary scale was required.

Ordinarily in pension plan valuations one salary scale is used for male contributors and one for female contributors. These scales vary from age to age from some very young age to the age at which it is assumed all contributors will have ceased to be employed. Clearly, a single salary increase pattern is not appropriate for all male contributors or for all female contributors where entry into a plan takes place at many different ages. For example, the salary of a contributor employed in the Public Service either at age 20 or at age 40 increases, on the average, at a fairly substantial rate for about 15 or 20 years and then levels off over the remaining years of employment. Thus, the salary increase pattern over the age range 40 to 60 is, on the average, much sharper for the contributor who becomes employed at age 40 than for the contributor who becomes employed at age 20. The usual salary scale, therefore, must necessarily be a compromise scale. The valuation functions based on such scale should produce

- (a) an average rate of contribution required in respect of new contributors, and
- (b) values of benefits and contributions in respect of current contributors,

that are the same, or very closely the same, as the corresponding average rate of contribution and values of benefits and contributions that would be produced by valuation functions based on a whole series of salary scales, one for each age at beginning of pensionable service.

Various studies were made in an attempt to ensure that the aggregate "compromise" salary scales constructed for this valuation were effective in producing contribution rates and values of benefits and contributions at the right level. For example, for each of the large groups of male and female whole-time contributors, salary scales were developed from the data for four groups of ages at beginning of pensionable service, namely, 17 to 26, 27 to 36, 37 to 46 and 47 to 56. On the basis of these "age group" salary scales, average required contribution rates and values of benefits and contributions

whole-time contributors were computed on an approximate basis. The rates and values determined by the primary valuation were all substantiated by the results of the auxiliary studies.

The rates of increase from age to age of the aggregate salary scales developed for this valuation were much sharper for the greater part of the age range 20 to 60 than those of the salary scales developed for the last valuation of the Superannuation plan, made as at December 31, 1947. The reason for the difference is not difficult to understand. The salary scales constructed for the 1947 valuation, although they reflected post-war salary changes up to that date, were still influenced to a large extent by the pattern of classification and promotion that had existed during the 1930's and the war years. On the other hand, the salary scales constructed for the current valuation were based mainly on patterns of salary increase that had developed during the period from 1948 to 1957, when

- (a) promotions were fairly rapid,
- (b) the level of salaries in many series of classes were raised, and
- (c) the salary steps through which employees may pass without promotion were increased, for many classes, both in amount and in frequency.

It is not unlikely that the patterns of increase in salaries that have developed over the past decade may change in some fashion in the future. Certainly, at the time the 1947 valuation was made it was difficult, if not impossible, to foresee the sharp change in the rates of increase in salary from age to age that would take place in the following ten years. At the present time, however, it seems likely that the patterns that have developed over recent years will remain applicable for the foreseeable future.

In Appendix 1 are shown the aggregate salary scales used for this valuation. In Appendix 2 is shown, for specimen ages, the manner in which an initial salary of \$1000 would increase in the future on the basis of the salary scales shown in Appendix 1. In Appendix 3 are shown the salary scales for whole-time contributors of ages 17-26, 27-36, 37-46 and 47-56 at beginning of pensionable service that were constructed for the auxiliary studies previously mentioned.

3. Rates of ceasing to be employed with less than five years of pensionable service

A return of contributions is the only benefit applicable, after 1958, in respect of a contributor who dies or otherwise ceases to be employed in the Public Service before he has to his credit five years of pensionable service. Thus, for valuation purposes, the rates of termination required for each of the first five years of pensionable service are the rates at which contributors cease to be employed for any reason. These are referred to below as rates of total termination.

From the experience of whole-time contributors over the 1948-57 period, select rates of total termination were derived for each of the first five years of pensionable service beginning at each age from 15 upwards. These select rates, as shown in Appendix 4, were used in the valuation for whole-time contributors.

A considerable proportion of prevailing rate and seasonal employees do not become contributors in the early years of service during which the rates of ceasing to be employed are very high. From tests made, it was found that the ultimate rates of total termination derived from the experience of whole-time contributors were suitably representative of the experience of prevailing rate and seasonal contributors with less than five years of pensionable service for valuation purposes. These rates are shown, for ages 20 to 59, in Appendix 5.

4. 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 employed in the Public Service, males and females separately;
- (b) contributors entitled to an annuity or annual allowance for reasons other than disability, males and females separately;
- (c) contributors entitled to an annuity because of disability, males and females separately;
- (d) widows of deceased contributors;
- (e) 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 employed in the Public Service

Ultimate rates of mortality for male and female whole-time contributors were derived from the experience (excluding the experience of the first five years of pensionable service) of these groups over the 1948-57 period. A comparison of these rates with the corresponding rates developed for the valuation of the Superannuation plan as at December 31, 1947, on the basis of experience prior to 1948, showed that mortality among employed contributors was significantly lighter during the 1948-57 period than during the earlier period. It is to be expected that mortality will continue to improve in future years as new drugs and vaccines are developed, as medical care and treatment methods are improved and as hospital facilities are expanded. Thus, it seemed appropriate to leave some margin in the rates used for this valuation as an allowance for expected improvement in mortality over future years.

The male rates of the α -1949 Table* Projected 10 Years exhibit the same pattern as the rates derived from the 1948-57 experience of male whole-time contributors and contain a small margin for improvement in mortality. These rates were thus considered suitable for valuation purposes and were so used.

No standard mortality table could be found that exhibited the same pattern of mortality as the rates derived from the 1948-57 experience of female whole-time contributors. Thus, the female whole-time contributor rates derived from the experience were graduated to leave a small margin for future improvement in mortality and the resulting rates were used in the valuation.

The rates for both males and females are shown in Appendix 6.

The mortality rates used in the valuation for whole-time contributors were tested against the 1948-57 mortality experience of prevailing rate and seasonal contributors and were found to be satisfactory for the latter groups for valuation purposes.

* The rates of the α -1949 Table for ages under age 60 were based on mortality experienced by active lives under group annuity contracts covering predominantly clerical employees and the rates for ages 60 and over were based on mortality experienced by annuitants in receipt of immediate nonrefund annuities.

Contributors entitled to an annuity or annual allowance
for reasons other than disability

Aggregate mortality rates were derived from the experience of male and female contributors over the 1948-57 period. These rates were then compared with the corresponding rates developed for the 1947 valuation on the basis of experience prior to 1948 and with the rates of various standard tables of mortality.

As a result of the tests and comparisons made, the male and female mortality rates of the α -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 would become so entitled in the future. The rates of the α -1949 Table followed the 1948-57 experience rates fairly closely and contain a small margin for expected future improvement in mortality.

The rates of the α -1949 Table, for ages 50 to 90, inclusive, and the relevant annuity values for the same ages are shown in Appendix 7.

(c) Contributors entitled to an annuity because of disability

Preliminary studies of the 1948-57 experience showed that mortality among contributors who cease to be employed because of disability is relatively heavy during an early period following retirement and improves rapidly thereafter. For valuation purposes, therefore, rates of mortality for disabled contributors should, for the first few years after retirement, depend upon duration from retirement as well as upon age. The studies indicated that the effect of duration could be ignored after the first three years following retirement. Accordingly, ultimate tables of mortality were derived from the 1948-57 experience, excluding the first three years after retirement. Select rates for each of the first three years after retirement were then calculated and studied in relation to the ultimate rates. As a result of these studies, it was considered appropriate to express the rates of mortality for each of the first three years after retirement as multiples of the ultimate rates for the same ages. The multiples used for the 1st, 2nd and 3rd years were -

for males, 250%, 175% and 125%, respectively, and
for females, 190%, 145% and 115%, respectively.

The select and ultimate rates described above were used for the valuation of annuities in respect of contributors entitled to an annuity because of disability at the date of valuation and also in respect of contributors who would become so entitled after that date.

Ultimate rates of mortality and annuity values based on select and ultimate rates and on ultimate rates only are set out in Appendix 8A, for males, and in Appendix 8B, for females.

(d) Widows

Aggregate mortality rates, derived from the 1948-57 experience of widows entitled to allowances under the Superannuation plan, were used in the valuation of both present and prospective widows' allowances. These rates were graduated to leave a small margin for future improvement in mortality.

The select and ultimate remarriage rates used in the valuation were developed from the experience, over the period from January 1, 1940, to December 31, 1957, of widows awarded pensions under the Pension Act and previous government administrative orders from August 4, 1914, to December 31, 1957. Particularly for the younger ages at widowhood, rates of remarriage are far more dependent upon time elapsed from date of widowhood than upon age. This "selection" extends for many years after widowhood. Consequently, select rates were developed for each of the first fourteen years after age at widowhood for each age at widowhood 18 to 56. After age 56, the "select" period was reduced by one year for each succeeding age at widowhood.

In Appendix 9 are shown

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

(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.

5. Rates of retirement because of age

These rates pertain to contributors who, at date of retirement, have five or more years of pensionable service and have attained age 60 or over.

Age 60 is the earliest age at which a contributor may retire with entitlement to an immediate annuity other than by reason of disability. It would seem reasonable, therefore, to expect that a substantial number of retirements would occur during the year of age 60 to 61. The experience of the 1948-57 period has borne this out. About 9% of all whole-time contributors employed in the Public Service at age 60 retire with entitlement to an immediate annuity in the following year of age. This proportion of retirements is higher than that for each of the three succeeding ages.

Age 65 may be regarded as the "normal retirement age". After that age, employment in the Public Service is contingent on special authorization being obtained from year to year. During the 1948-57 period, about 55% of all whole-time contributors employed in the Public Service at age 65 retired with entitlement to an immediate annuity in the following year of age.

As indicated earlier in this report, it has been assumed for valuation purposes that all contributors employed in the Public Service at age 70 cease to be employed in the following year of age.

Because of the features described above, the rates of retirement derived from the 1948-57 experience and used in the valuation do not increase smoothly from age 60 to 70. They are shown in Appendix 10.

6. Rates of retirement because of disability

These rates pertain to contributors who, at date of retirement, have five or more years of pensionable service and have not attained age 60. The rates used in the valuation were derived from the 1948-57 experience of whole-time contributors. They are shown in Appendix 11.

7. Rates of ceasing to be employed, with five or more years of pensionable service, for reasons other than age, disability or death, and

Proportions of contributors who, on ceasing to be employed, elect to take a deferred annuity benefit

These rates pertain only to contributors who have not attained age 60. On ceasing to be employed for reasons other than age, disability or death, such contributors have the option of electing to take one of three benefits, namely, a return of contributions, a deferred annuity to commence at age 60, or an annual allowance to commence immediately if the contributor's age is 50 or over or at age 50 if the contributor's age is under 50 (the annual allowance is calculated

in such manner that its value, in accordance with certain mortality and interest assumptions, is equal to the value of the deferred annuity).

The value of a return of contributions benefit is considerably less than the value of a deferred annuity benefit which is supported by both contributor and government contributions. For valuation purposes, therefore, it was necessary to determine the proportion of contributors who, on ceasing to be employed, elect to take a deferred annuity benefit (including those who elect to take an annual allowance).

Both the rates of ceasing to be employed for reasons other than age, disability and death and the proportions of contributors who elect to take a deferred annuity benefit on so ceasing to be employed were derived from the 1948-57 experience of whole-time contributors. They are shown in Appendix 12.

8. 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 employed in the Public Service at death and of contributors entitled to an annuity or annual allowance at death. From the 1948-57 experience, proportions of male contributors married at death were derived for the employed and retired contributor groups, separately, and average ages of widows corresponding to the ages at death of their contributor husbands were derived for the two contributor groups combined. They are shown for quinquennial ages of contributors at death in Appendix 13.

9. Children's benefits

For each age at death of contributors, there was needed the average 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 on immediate annuity at the date of his death. These values, derived from the 1948-57 experience data, are shown in Appendix 13 for quinquennial ages of contributors at death.

10. Capitalized values of annuity or annual allowance benefits

In Appendix 14 are shown, for quinquennial ages, the values of annuities or annual allowances emerging

- (a) on retirement below age 60 with entitlement to an annuity or annual allowance for reasons other than disability,
- (b) on retirement with entitlement to an annuity because of age,
- (c) on retirement with entitlement to an annuity because of disability, and
- (d) on death leaving dependents with entitlement to an annual allowance.

For retirements below age 60 for reasons other than disability, the contributor's benefit is a deferred annuity to commence at age 60. For all male retirements, the values include provision for prospective allowances to widows and children. For all cases except deaths of retired contributors, the 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 Public Service Superannuation Act, annuity and annual allowance benefits are based on an annual salary obtained by averaging salaries received over a selected period of years. In this type of plan, a general increase in the level of salaries creates an extra liability in respect of employed contributors because the increase in the value of future benefits resulting from a salary increase is greater than the corresponding increase in the value of future contributions. In establishing the contribution rates required for new contributors, the effect of any general increase in the level of salaries that may take place in the future has not been taken into account.

As described earlier in this report, contributions for current service are equal to 6% of salary for male contributors and 5% of salary for female contributors, and contributions for periods of prior service are, in the usual case, based on 6% of salary, for males, and 5% of salary, for females, received during those periods. Also, government contributions equal all current service and prior service contributions made by contributors. Thus, total contributions to the Superannuation Account are made at the rate of approximately 12% of salary received by male contributors and 10% of salary received by female contributors for any period of pensionable service.

In the following schedule are shown the total average contribution rates estimated to be required in respect of new whole-time contributors to pay for the benefits provided under the Act. Also shown is a breakdown of the male contribution rate into the component rates required to provide benefits payable to (a) the contributor or his estate, and (b) dependents of the contributor. These average rates are based on the assumptions with respect to future experience described earlier in this report and on the age distribution, at date of becoming a contributor, of whole-time employees who became contributors to the Superannuation Account over the period from January 1, 1955, to December 31, 1957 (Appendix 15).

Average Required Contribution Rates for whole-time contributors in respect of benefits payable to

	<u>Contributor</u>	<u>Dependents</u>	<u>Total</u>
Males	9.9	2.5	12.4%
Females	9.7	-	9.7

Investigation showed that the average contribution rates shown in the above schedule for whole-time contributors were somewhat lower than those required for contributors of the relatively small prevailing rate and seasonal groups.

General Salary Increases

As noted in the preceding section, an extra liability is created in respect of employed contributors whenever a general increase in the level of salaries takes place. Section 32(2) of the Act provides that as soon as possible after the authorization of any salary increase of general application to the Public Service, there shall be credited to the Superannuation Account an amount estimated to be equal to the extra liability created by such salary increase.

In implementation of this provision, credits have been made to the Superannuation Account in respect of four general salary increases. The details are given in the following schedule:

<u>Effective date</u>	<u>Estimated net liability created by an increase of 1% in salaries</u>	<u>Amount credited to Superannuation Account</u>
Dec. 1, 1951	\$2.9 million	\$23.0 million
" 1, 1953	3.8 "	38.0 "
Apr. 1, 1956	5.1 "	40.8 "
May 1, 1957	6.2 "	44.3 "

It may be noted from the above schedule that the net liability created by a 1% general increase in salaries has continually increased. This fact requires some explanation.

Suppose, for example, that at a certain date, in respect of employed contributors,

- (1) the balance in the Account is \$450 million,
- (2) the value of future benefits is \$800 million, and
- (3) the value of future contributions is \$350 million, of which \$300 million is the value of future current service contributions.

A salary increase of 1% at that date cannot affect the \$450 million balance in the Account. It has the effect of increasing the value of future benefits by about nine-tenths of 1% and of increasing the value of future current service contributions by a full 1%. Thus, a salary increase of 1% would create a net liability of

$$.009 \times 800,000,000 - .01 \times 300,000,000 = \$4.2 \text{ million.}$$

Over the past years, in respect of employed contributors, the increase in the value of future benefits has been far greater than the increase in the value of future contributions for several reasons, two of the most important ones being

- (1) average annual salary on which annuity benefits are based has increased sharply, and
- (2) the number of contributors has increased from year to year.

At each general salary increase date, therefore, the net liability created by a general salary increase of 1% has been greater than that at the previous increase date. It is to be expected that this pattern will continue for many years in the future.

Valuation Summary

The following balance sheet summarizes the results of the valuation. It also shows the financial status of the Superannuation Account as at December 31, 1957, assuming that contributions will continue to be made to the Account at the rates in effect at that date.

Superannuation Account

Valuation Balance Sheet as at December 31, 1957

Assets

Balance of Account			\$1,032,289,000
Contributions due from government			27,513,000
Present value of future contributions from contributors:			
<u>Employed contributors</u>			
<u>Current service</u>			
Whole-time	- Males	\$298,893,000	
	Females	53,640,000	
Prevailing Rate	- Males	15,140,000	
	Females	304,000	
Seasonal	- Males	1,596,000	
	Females	102,000	\$369,675,000
<u>Prior service</u>			
Whole-time	- Males	15,671,000	
	Females	1,881,000	
Prevailing Rate	- Males	2,617,000	
	Females	32,000	
Seasonal	- Males	128,000	
	Females	27,000	20,356,000
<u>Retired contributors</u>			
<u>Prior service</u>			
Males		\$3,085,000	
Females		277,000	3,362,000
			393,393,000
Present value of future contributions from government:			<u>393,393,000</u>
	Total Assets		\$1,846,588,000
Deficit			<u>137,661,000</u>
			<u>\$1,984,249,000</u>

Liabilities

Present value of prospective benefits to employed contributors:

Whole-time	- Males	\$1,336,917,000	
	Females	262,867,000	
Prevailing Rate	- Males	75,482,000	
	Females	1,875,000	
Seasonal	- Males	13,514,000	
	Females	858,000	\$1,691,513,000

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

Retired contributors

Entitled for reasons other than disability	- Males	\$184,054,000	
	Females	19,674,000	
Entitled because of disability	- Males	29,971,000	
	Females	7,014,000	\$240,713,000

Widows 51,036,000

Children 580,000 292,329,000

Contributions held pending refund to former employees

407,000

Total Liabilities

\$1,984,249,000

The deficit, as disclosed by the foregoing balance sheet, was \$137.7 million as at December 31, 1957. However, this item cannot be considered by itself.

In the government balance sheet, there is an asset item entitled "Unamortized portion of actuarial deficiency in the superannuation account - \$139.0 million." This "deferred charge" represents the unliquidated portion of the deficiency in the Superannuation Account as estimated some years prior to the current actuarial examination.

The balance in the Account was \$1,032 million as at December 31, 1957. Included in this balance was an amount equal to the deferred charge described above, namely, \$139 million. If this amount had not been included, the deficit in the Account as at December 31, 1957, would have been \$276.7 million.

The history of the deferred charge is as follows:

1. In the report of the Chief Actuary, dated April 12, 1951, on the actuarial examination of the Superannuation Account as at December 31, 1947, the deficit shown in the valuation summary was \$252 million.
2. In the fiscal year 1950-51, the government made a special contribution of \$75 million towards the deficit in the Account.

3. After the 1950-51 contribution had been made, the Chief Actuary estimated that, due to (a) interest accumulating on the deficit from December 31, 1947, (b) salary increases, and (c) a large number of new contributors bringing with them prior service in respect of which only employee contributions were payable, the deficit would amount to \$289 million as at December 31, 1951.

4. In the fiscal year 1951-52, the government made a second special contribution of \$75 million towards the deficit. At the same time, the Account was credited with \$214 million to make the balance in the Account equal to the estimated net liability at that time. As an offsetting entry, the \$214 million was set up as a deferred charge in the government balance sheet, to be written off to budgetary expenditures. By this procedure, the estimated deficiency pertaining to the Account was prevented from growing with interest, since interest is credited periodically on the balance in the Account which includes the amount of the deficiency.

5. In the fiscal year 1952-53, the government made a special contribution of \$25 million towards the deferred charge, reducing it to \$189 million.

6. In the fiscal year 1956-57, the government made a special contribution of \$50 million towards the deferred charge, reducing it to \$139 million. It still stands at this amount.

The net effect of the many changes that have occurred in the ten years elapsed since the previous examination of the Account has been the creation of the estimated deficit of \$137.7 million as at December 31, 1957. Some of the more important changes and their effects on the liability are discussed below:

1. As described earlier in this report, the salary patterns of contributors are very different at the present time from the salary scales used in the 1947 valuation. The salary scales used in this valuation to reflect current salary increase patterns caused a substantial increase in the liability.

2. There has been a significant improvement in the mortality of both employed and retired contributors over the last two decades. The strengthening of the mortality assumptions for the 1957 valuation to take account of past and probable future improvement in mortality had the effect of increasing the liability.

3. Remarriage rates used in the 1957 valuation to reflect the present remarriage experience among widows entitled to annual allowances were considerably higher than those used for the 1947 valuation. This had the effect of decreasing the liability.

4. Many thousands of persons employed in the Public Service became contributors when the Public Service Superannuation Act came into force on January 1, 1954. Two opposing effects on the liability resulted from this extension of coverage. On the one hand, many of these new contributors brought in with them some years of prior service. The benefit liability created thereby was substantially higher than the contributions payable in respect of that service. On the other hand, the turnover in the early years of service of these contributors was very high compared with that of the former group of contributors who had to have "permanent" status before becoming contributors. As a result, government contributions and interest released in respect of contributors who ceased to be employees and received a return of their own contributions has been very substantial. This holds true also for employees who have become contributors since January 1, 1954.

5. At the time of the 1947 valuation, the pattern of age retirements resulting from the introduction of the benefit of an immediate annuity on voluntary retirement at ages 60 to 64 had not yet developed. The rates of age retirement, for ages 60 to 64, used in the 1947 valuation were considerably higher than the rates developed from the experience of the 1948-57 period and used for the 1957 valuation. This had the effect of decreasing the liability to a significant degree.

Summary and Recommendations

1. The estimated deficit in the Superannuation Account as at December 31, 1957, was \$137.7 million. It is recommended that this deficit, together with the "Unamortized portion of actuarial deficiency in the superannuation account," amounting to \$139 million, be liquidated as soon as may reasonably be possible. It is also recommended that, until liquidation of the deficit has been completed, interest be credited to the Account in respect of the amount of deficit remaining from time to time, to keep it from growing with interest.

2. The average contribution rate estimated to be required to pay for the benefits provided under the Act is 12.4% of salary for male contributors and 9.7% of salary for female contributors. A change in the age distribution of new contributors, in the pattern of increase in salaries from age to age or in one of many other elements would have the effect of increasing or decreasing the estimated required rates of contribution to some degree. It is recommended, therefore, that no change be made in the contribution rates at this time. If, however, benefits were to be liberalized in some manner in the future, any resulting increase in the male contribution rate should also take account of the estimated current deficiency as respects that rate.

In conclusion, it is a pleasure to acknowledge the cooperation and assistance given by the Dominion Bureau of Statistics of the Department of Trade and Commerce and by Central Pay Office and the Superannuation Branch of the Department of Finance.

Respectfully submitted,



Chief Actuary

August 21, 1959
Department of Insurance,
Ottawa

A P P E N D I C E S

Salary Scales

Tables of Rates

Tables of Annuity Values

Age Distributions

APPENDIX 1

Aggregate Salary Scales

Type of Contributor

<u>Age</u>	<u>Whole-time</u>		<u>Prevailing Rate and Seasonal</u>	
	<u>Males</u>	<u>Females</u>	<u>Males</u>	<u>Females</u>
15	0.344	0.356	0.731	1.000
16	0.356	0.368	0.735	1.000
17	0.370	0.382	0.740	1.000
18	0.385	0.396	0.746	1.000
19	0.401	0.412	0.752	1.000
20	0.418	0.429	0.759	1.000
21	0.436	0.447	0.766	1.000
22	0.455	0.466	0.773	1.000
23	0.475	0.486	0.780	1.000
24	0.496	0.507	0.788	1.000
25	0.517	0.529	0.796	1.000
26	0.539	0.551	0.804	1.000
27	0.561	0.573	0.812	1.000
28	0.583	0.596	0.820	1.000
29	0.605	0.619	0.828	1.000
30	0.627	0.642	0.837	1.000
31	0.649	0.664	0.846	1.000
32	0.670	0.686	0.855	1.000
33	0.691	0.707	0.864	1.000
34	0.711	0.728	0.873	1.000
35	0.731	0.748	0.882	1.000
36	0.750	0.767	0.890	1.000
37	0.769	0.785	0.898	1.000
38	0.787	0.802	0.906	1.000
39	0.804	0.819	0.914	1.000
40	0.820	0.834	0.922	1.000
41	0.836	0.849	0.930	1.000
42	0.850	0.863	0.937	1.000
43	0.863	0.876	0.944	1.000
44	0.876	0.888	0.950	1.000
45	0.887	0.899	0.956	1.000
46	0.898	0.910	0.961	1.000
47	0.908	0.919	0.966	1.000
48	0.917	0.928	0.970	1.000
49	0.926	0.936	0.974	1.000
50	0.934	0.943	0.978	1.000
51	0.941	0.950	0.981	1.000
52	0.948	0.956	0.984	1.000
53	0.954	0.962	0.986	1.000
54	0.960	0.967	0.988	1.000
55	0.965	0.971	0.990	1.000
56	0.969	0.975	0.992	1.000
57	0.973	0.979	0.994	1.000
58	0.977	0.982	0.995	1.000
59	0.980	0.985	0.996	1.000
60	0.983	0.988	0.997	1.000
61	0.986	0.990	0.998	1.000
62	0.988	0.992	0.998	1.000
63	0.990	0.994	0.999	1.000
64	0.992	0.995	0.999	1.000
65	0.994	0.996	1.000	1.000
66	0.995	0.997	1.000	1.000
67	0.997	0.998	1.000	1.000
68	0.998	0.998	1.000	1.000
69	0.999	0.999	1.000	1.000
70	1.000	1.000	1.000	1.000

A P P E N D I X 2

Illustration of Increase in Salary

Type of Contributor

<u>Age</u>	<u>Whole-time</u>						<u>Prevailing Rate and Seasonal</u>		
	<u>Males</u>			<u>Females</u>			<u>Males</u>		
20	\$1000			\$1000			\$1000		
25	1237			1233			1049		
30	1500	\$1000		1497	\$1000		1103	\$1000	
35	1749	1166		1744	1165		1162	1054	
40	1962	1308	\$1000	1944	1299	\$1000	1215	1102	\$1000
45	2122	1415	1082	2096	1400	1078	1260	1142	1037
50	2234	1490	1139	2198	1469	1131	1289	1168	1061
55	2309	1539	1177	2263	1512	1164	1304	1183	1074
60	2352	1568	1199	2303	1539	1185	1314	1191	1081
65	2378	1585	1212	2322	1551	1194	1318	1195	1085

A P P E N D I X 4

Select Rates of Ceasing to be Employed for all reasons

Whole-time Contributors

Age at beg. of Pens. Svc.	<u>Males</u>					<u>Females</u>				
	<u>Completed Years of Pensionable Service</u>					<u>Completed Years of Pensionable Service</u>				
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
15	.3714	.3116	.2725	.1842	.1174	.2071	.1934	.1895	.1918	.1557
16	.3492	.2918	.2300	.1674	.1084	.2232	.2171	.2033	.2048	.1707
17	.3280	.2711	.2080	.1513	.0995	.2391	.2427	.2171	.2178	.1888
18	.3067	.2491	.1836	.1362	.0907	.2563	.2703	.2318	.2313	.2040
19	.2856	.2266	.1631	.1228	.0824	.2769	.2999	.2480	.2424	.2142
20	.2641	.2044	.1422	.1110	.0751	.2990	.3266	.2665	.2496	.2201
21	.2432	.1827	.1250	.1009	.0691	.3199	.3445	.2840	.2492	.2193
22	.2218	.1630	.1122	.0922	.0643	.3372	.3505	.2901	.2469	.2120
23	.2013	.1460	.1025	.0849	.0606	.3490	.3479	.2871	.2395	.2015
24	.1830	.1325	.0950	.0788	.0574	.3525	.3417	.2794	.2308	.1891
25	.1715	.1218	.0891	.0738	.0549	.3484	.3331	.2691	.2202	.1765
26	.1645	.1136	.0845	.0697	.0529	.3421	.3214	.2572	.2079	.1641
27	.1597	.1073	.0809	.0664	.0511	.3352	.3090	.2455	.1961	.1520
28	.1564	.1023	.0780	.0638	.0497	.3281	.2970	.2330	.1844	.1401
29	.1538	.0983	.0757	.0616	.0484	.3206	.2852	.2202	.1729	.1289
30	.1520	.0952	.0738	.0599	.0475	.3125	.2734	.2077	.1620	.1186
31	.1504	.0928	.0723	.0585	.0467	.3034	.2620	.1951	.1519	.1089
32	.1491	.0910	.0710	.0573	.0460	.2933	.2508	.1822	.1422	.1000
33	.1481	.0897	.0700	.0564	.0455	.2822	.2397	.1697	.1331	.0920
34	.1474	.0888	.0691	.0557	.0452	.2698	.2286	.1574	.1249	.0850
35	.1468	.0881	.0684	.0552	.0450	.2571	.2181	.1466	.1178	.0790
36	.1462	.0877	.0679	.0547	.0448	.2441	.2075	.1375	.1115	.0741
37	.1458	.0875	.0675	.0544	.0449	.2321	.1972	.1300	.1061	.0699
38	.1453	.0875	.0672	.0543	.0450	.2212	.1871	.1241	.1017	.0666
39	.1448	.0876	.0670	.0542	.0452	.2120	.1771	.1195	.0980	.0636
40	.1444	.0878	.0669	.0542	.0456	.2043	.1676	.1159	.0949	.0614
41	.1440	.0881	.0669	.0544	.0460	.1977	.1579	.1130	.0924	.0596
42	.1436	.0885	.0671	.0546	.0465	.1925	.1494	.1107	.0903	.0583
43	.1432	.0890	.0672	.0549	.0470	.1882	.1423	.1089	.0889	.0574
44	.1429	.0895	.0675	.0553	.0476	.1848	.1364	.1074	.0877	.0568
45	.1425	.0901	.0679	.0559	.0484	.1822	.1317	.1064	.0869	.0566
46	.1422	.0908	.0682	.0565	.0493	.1800	.1280	.1056	.0864	.0567
47	.1419	.0916	.0688	.0573	.0503	.1785	.1253	.1050	.0861	.0572
48	.1416	.0924	.0695	.0582	.0516	.1774	.1233	.1046	.0859	.0581
49	.1412	.0933	.0703	.0593	.0530	.1765	.1219	.1046	.0860	.0593
50	.1409	.0942	.0713	.0606	.0547	.1759	.1211	.1047	.0864	.0611
51	.1406	.0952	.0725	.0621	.0567	.1754	.1208	.1052	.0871	.0633
52	.1404	.0964	.0741	.0642	.0590	.1750	.1208	.1059	.0881	.0661
53	.1401	.0978	.0759	.0666	.0618	.1748	.1213	.1069	.0896	.0694
54	.1397	.0993	.0783	.0685	.0650	.1748	.1222	.1082	.0917	.0737
55	.1394	.1013	.0812	.0730	.0688	.1749	.1234	.1100	.0942	.0790

A P P E N D I X 5

Ultimate Rates of Ceasing to be Employed for all reasons

Whole-time Contributors

<u>Age</u>	<u>Males</u>	<u>Females</u>
20	.0693	.1108
21	.0639	.1224
22	.0589	.1457
23	.0542	.1606
24	.0499	.1624
25	.0460	.1589
26	.0425	.1486
27	.0394	.1329
28	.0367	.1167
29	.0344	.1038
30	.0323	.0927
31	.0304	.0830
32	.0287	.0744
33	.0272	.0670
34	.0258	.0604
35	.0245	.0545
36	.0234	.0493
37	.0223	.0447
38	.0214	.0406
39	.0207	.0370
40	.0199	.0340
41	.0192	.0314
42	.0186	.0292
43	.0182	.0273
44	.0180	.0257
45	.0179	.0244
46	.0179	.0234
47	.0182	.0227
48	.0187	.0223
49	.0193	.0221
50	.0201	.0221
51	.0211	.0224
52	.0223	.0230
53	.0237	.0240
54	.0253	.0254
55	.0271	.0271
56	.0291	.0292
57	.0313	.0316
58	.0336	.0341
59	.0360	.0370

A P P E N D I X 6

Rates of Mortality for employed contributors

<u>Age</u>	<u>Males</u>	<u>Females</u>
20	.0006	.0006
21	.0006	.0006
22	.0006	.0006
23	.0006	.0006
24	.0006	.0006
25	.0007	.0006
26	.0007	.0006
27	.0007	.0007
28	.0008	.0007
29	.0008	.0007
30	.0009	.0007
31	.0009	.0007
32	.0010	.0007
33	.0011	.0008
34	.0011	.0008
35	.0012	.0008
36	.0013	.0008
37	.0014	.0008
38	.0015	.0009
39	.0017	.0009
40	.0018	.0010
41	.0020	.0010
42	.0022	.0011
43	.0025	.0011
44	.0028	.0012
45	.0032	.0013
46	.0036	.0014
47	.0041	.0015
48	.0046	.0016
49	.0052	.0018
50	.0058	.0019
51	.0064	.0021
52	.0071	.0023
53	.0078	.0025
54	.0085	.0028
55	.0093	.0030
56	.0101	.0033
57	.0110	.0037
58	.0119	.0040
59	.0128	.0044
60	.0138	.0049
61	.0149	.0054
62	.0161	.0060
63	.0175	.0067
64	.0190	.0075
65	.0206	.0084
66	.0225	.0094
67	.0245	.0106
68	.0268	.0120
69	.0292	.0137
70	.0320	.0157

A P P E N D I X 7

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

Value of Annuity of \$1.00 per
annum to commence at age 60 or
immediately if age is 60 or over
(interest at 4% per annum)

<u>Age</u>	<u>Rates of Mortality</u>		<u>Value of Annuity of \$1.00 per annum to commence at age 60 or immediately if age is 60 or over (interest at 4% per annum)</u>	
	<u>Males</u>	<u>Females</u>	<u>Males</u>	<u>Females</u>
50	.0066	.0031	\$6.923	\$8.156
51	.0073	.0034	7.272	8.545
52	.0080	.0036	7.650	8.961
53	.0088	.0040	8.061	9.409
54	.0097	.0043	8.509	9.893
55	.0106	.0047	8.999	10.422
56	.0115	.0051	9.537	11.002
57	.0125	.0056	10.129	11.642
58	.0135	.0062	10.785	12.352
59	.0145	.0068	11.515	13.144
60	.0157	.0075	12.331	14.030
61	.0169	.0083	11.999	13.677
62	.0182	.0091	11.665	13.319
63	.0197	.0101	11.326	12.955
64	.0213	.0112	10.985	12.585
65	.0231	.0124	10.642	12.211
66	.0250	.0138	10.297	11.832
67	.0272	.0153	9.950	11.450
68	.0296	.0170	9.603	11.065
69	.0322	.0189	9.256	10.677
70	.0351	.0210	8.909	10.287
71	.0383	.0233	8.563	9.897
72	.0418	.0260	8.219	9.506
73	.0456	.0289	7.878	9.116
74	.0499	.0322	7.540	8.727
75	.0545	.0358	7.206	8.341
76	.0596	.0399	6.876	7.957
77	.0652	.0445	6.551	7.578
78	.0714	.0495	6.232	7.203
79	.0781	.0551	5.920	6.835
80	.0855	.0614	5.614	6.473
81	.0936	.0684	5.316	6.118
82	.1024	.0761	5.026	5.771
83	.1121	.0847	4.744	5.434
84	.1227	.0942	4.471	5.106
85	.1342	.1048	4.208	4.789
86	.1467	.1164	3.954	4.482
87	.1603	.1293	3.709	4.187
88	.1751	.1434	3.475	3.904
89	.1912	.1590	3.251	3.633
90	.2085	.1762	3.037	3.375

APPENDIX 8A

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

Age	Ultimate Rates	Value of Annuity of \$1.00 per annum (interest at 4% per annum)	
		At date of retirement	After at least 3 yrs. have elapsed from date of retirement
25	.0072	\$18.232	\$18.550
26	.0073	18.093	18.408
27	.0074	17.945	18.261
28	.0075	17.791	18.110
29	.0076	17.630	17.952
30	.0077	17.462	17.789
31	.0078	17.291	17.621
32	.0080	17.113	17.445
33	.0082	16.929	17.265
34	.0084	16.740	17.080
35	.0086	16.543	16.889
36	.0088	16.340	16.693
37	.0090	16.132	16.490
38	.0093	15.918	16.281
39	.0096	15.700	16.066
40	.0100	15.467	15.845
41	.0103	15.232	15.620
42	.0107	14.990	15.389
43	.0111	14.743	15.152
44	.0116	14.494	14.909
45	.0122	14.232	14.661
46	.0128	13.976	14.410
47	.0135	13.712	14.154
48	.0142	13.441	13.894
49	.0150	13.160	13.630
50	.0158	12.858	13.364
51	.0167	12.530	13.093
52	.0177	12.184	12.819
53	.0188	11.868	12.543
54	.0200	11.600	12.264
55	.0212	11.379	11.985
56	.0225	11.190	11.703
57	.0240	11.028	11.419
58	.0256	10.883	11.135
59	.0273	10.750	10.851
60	.0292		10.567
65	.0400		9.167
70	.0549		7.798
75	.0751		6.479
80	.1044		5.234
85	.1464		4.092
90	.2085		3.037

APPENDIX 8B

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

Age	Ultimate Rates	Value of Annuity of \$1.00 per annum (interest at 4% per annum)	
		At date of retirement	After at least 3 yrs. have elapsed from date of retirement
25	.0069	\$19.275	\$19.469
26	.0070	19.171	19.365
27	.0071	19.062	19.257
28	.0072	18.950	19.147
29	.0073	18.834	19.034
30	.0074	18.716	18.917
31	.0075	18.595	18.796
32	.0076	18.469	18.672
33	.0077	18.340	18.544
34	.0078	18.209	18.411
35	.0079	18.067	18.274
36	.0080	17.920	18.132
37	.0081	17.770	17.985
38	.0082	17.619	17.833
39	.0084	17.461	17.675
40	.0086	17.297	17.514
41	.0088	17.133	17.348
42	.0090	16.960	17.177
43	.0092	16.782	17.002
44	.0094	16.597	16.821
45	.0096	16.405	16.635
46	.0098	16.214	16.443
47	.0100	16.013	16.245
48	.0103	15.808	16.040
49	.0106	15.593	15.830
50	.0109	15.369	15.614
51	.0112	15.132	15.392
52	.0116	14.892	15.163
53	.0120	14.645	14.928
54	.0124	14.408	14.688
55	.0128	14.175	14.441
56	.0133	13.952	14.186
57	.0138	13.736	13.926
58	.0144	13.532	13.658
59	.0150	13.333	13.384
60	.0157		13.104
65	.0203		11.610
70	.0277		9.978
75	.0401		8.242
80	.0620		6.468
85	.1048		4.789
90	.1762		3.375

A P P E N D I X 9

Rates of Remarriage and Mortality for widows

<u>Age at Widowhood</u>	<u>Rates of Remarriage</u>					<u>Attained Age</u>	<u>Rates of Mortality</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 death or remarriage 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 10

Rates of Retirement because of age

<u>Age</u>	<u>Males</u>	<u>Females</u>
60	.0870	.0950
61	.0679	.0799
62	.0640	.0765
63	.0734	.0863
64	.0926	.1060
65	.5496	.5600
66	.4312	.3996
67	.3330	.2674
68	.3000	.2170
69	.3654	.3236
70	1.0000	1.0000

APPENDIX 11

Rates of Retirement because of disability

<u>Age</u>	<u>Males</u>	<u>Females</u>
15	.0001	.0011
16	.0001	.0011
17	.0001	.0011
18	.0001	.0011
19	.0001	.0011
20	.0002	.0011
21	.0002	.0011
22	.0002	.0011
23	.0002	.0011
24	.0002	.0012
25	.0002	.0012
26	.0003	.0012
27	.0003	.0012
28	.0003	.0012
29	.0003	.0012
30	.0004	.0012
31	.0004	.0013
32	.0004	.0013
33	.0004	.0013
34	.0005	.0013
35	.0005	.0014
36	.0006	.0014
37	.0006	.0015
38	.0007	.0015
39	.0008	.0016
40	.0009	.0017
41	.0010	.0018
42	.0011	.0020
43	.0013	.0022
44	.0015	.0024
45	.0017	.0027
46	.0020	.0031
47	.0024	.0036
48	.0029	.0041
49	.0035	.0047
50	.0042	.0054
51	.0050	.0062
52	.0059	.0072
53	.0070	.0085
54	.0082	.0100
55	.0095	.0118
56	.0109	.0139
57	.0124	.0162
58	.0140	.0187
59	.0157	.0214

APPENDIX 12

Rates of Ceasing to be Employed, with five or more years of pensionable service, for reasons other than age, disability or death

and

Proportions of contributors electing to take deferred annuity

<u>Age</u>	<u>Males</u>		<u>Females</u>	
	<u>Rates of ceasing to be employed</u>	<u>Proportion electing deferred annuity</u>	<u>Rates of ceasing to be employed</u>	<u>Proportion electing deferred annuity</u>
20	.0685	.044	.1091	.009
21	.0631	.049	.1207	.012
22	.0581	.055	.1140	.014
23	.0534	.061	.1589	.018
24	.0491	.066	.1606	.022
25	.0451	.072	.1571	.026
26	.0415	.078	.1468	.031
27	.0384	.084	.1310	.037
28	.0357	.090	.1148	.043
29	.0333	.096	.1019	.050
30	.0311	.102	.0908	.058
31	.0291	.109	.0810	.067
32	.0273	.115	.0724	.077
33	.0257	.121	.0649	.087
34	.0242	.128	.0583	.099
35	.0228	.135	.0524	.111
36	.0215	.141	.0471	.124
37	.0203	.148	.0424	.137
38	.0192	.155	.0382	.152
39	.0182	.162	.0345	.167
40	.0172	.170	.0313	.183
41	.0162	.177	.0285	.200
42	.0153	.185	.0261	.218
43	.0145	.192	.0240	.236
44	.0137	.200	.0221	.254
45	.0130	.209	.0204	.274
46	.0123	.217	.0189	.294
47	.0117	.225	.0176	.314
48	.0111	.234	.0165	.335
49	.0106	.243	.0156	.357
50	.0101	.252	.0148	.379
51	.0097	.260	.0141	.401
52	.0093	.270	.0135	.424
53	.0089	.279	.0130	.447
54	.0086	.288	.0126	.470
55	.0083	.297	.0123	.493
56	.0081	.307	.0120	.517
57	.0079	.316	.0117	.541
58	.0077	.326	.0114	.565
59	.0075	.336	.0112	.588

A P P E N D I X 13

Proportions of male 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 Male Contributors married at death</u>		<u>Average age of Widows</u>	<u>Value of Children's Benefits</u>	
	<u>Employed Contributors</u>	<u>Retired Contributors</u>		<u>Employed Contributors</u>	<u>Retired Contributors</u>
25	.811	.315	24.36	\$1.624	\$0.576
30	.826	.455	29.01	1.679	.832
35	.844	.575	33.61	1.628	.991
40	.864	.673	38.16	1.417	.977
45	.885	.749	42.68	1.025	.763
50	.901	.802	47.20	.618	.476
55	.909	.828	51.68	.316	.243
60	.898	.826	56.14	.139	.106
65	.867	.797	60.57	.051	.039
70	.832	.737	64.94	.016	.011
75		.646	69.19		.003
80		.526	73.20		
85		.392	76.57		
90		.263	78.58		

A P P E N D I X 14

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

<u>Age of Contributor at Retirement</u>	<u>On Retirement for reasons other than disability</u>		<u>On Retirement because of age</u>	
	<u>Males</u>	<u>Females</u>	<u>Males</u>	<u>Females</u>
50	\$9.452	\$9.469		
55	11.433	11.449		
60			\$14.138	\$14.053
65			12.437	12.250
70			10.621	10.352

On Retirement because of disability

<u>Age of Contributor at Retirement</u>	<u>Males</u>	<u>Females</u>
25	\$19.648	\$19.311
30	19.146	18.755
35	18.492	18.108
40	17.658	17.342
45	16.642	16.455
50	15.392	15.426
55	14.068	14.242
59	13.482	13.441

On Death leaving dependents entitled to annual allowance

<u>Age of Contributor at Death</u>	<u>Employed Male Contributors</u>	<u>Retired Male Contributors</u>
25	\$6.562	\$5.804
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	6.916	6.809
70	6.198	6.052
75		5.312
80		4.635
85		4.095
90		3.787

A P P E N D I X 15

Age Distribution of whole-time employees who became contributors during the period from January 1, 1955, to December 31, 1957

<u>Age</u>	<u>Males</u>	<u>Females</u>
15	38	25
16	285	441
17	720	1,621
18	1,074	2,435
19	1,410	2,259
20	1,360	1,677
21	1,305	1,427
22	1,391	1,426
23	1,315	1,265
24	1,390	1,007
25	1,330	1,046
26	1,257	900
27	1,087	902
28	1,075	761
29	975	693
30	1,033	628
31	1,070	701
32	1,007	658
33	1,138	616
34	1,111	706
35	1,088	658
36	1,007	614
37	900	513
38	809	497
39	774	465
40	792	481
41	718	446
42	706	442
43	692	381
44	594	316
45	607	337
46	561	319
47	520	304
48	471	258
49	428	227
50	458	221
51	422	175
52	395	163
53	347	167
54	324	140
55	321	122
56	335	97
57	287	101
58	265	90
59	260	70
60	223	59
61	184	44
62	110	31
63	106	30
64	66	15
65 and over	100	17
Total	36,241	28,994