State Employees' Retirement Association
of Minnesota

REPORT ON AN ACTUARIAL SURVEY OF THE OPERATING EXPERIENCE OF THE STATE EMPLOYEES' RETIREMENT ASSOCIATION AND AN ACTUARIAL VALUATION OF ITS ASSETS AND LIABILITIES

January 1, 1958

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RETIREMENT & PENSION PLANS
CERTIFIED PUBLIC ACCOUNTANT

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May 31, 1958

Board of Directors,
State Employees' Retirement
Association of Minnesota,
201 State Office Building,
St. Paul, Minnesota.

Dear Sirs:

We submit herewith our report on an actuarial survey of the operations of the State Employees' Retirement System for the period from July 1, 1929 to December 31, 1957, and an actuarial valuation of its assets and liabilities as of January 1, 1958. The law in force at the latter date reflects the coordination of the system with federal social security.

This report was prepared in accordance with the directive contained in an Act approved May 2, 1957, entitled "An Act relating to actuarial surveys for pension and retirement funds created by the Legislature."

A considerable amount of statistical data was compiled by the office of the system for this study. The accumulation of this data will be available for similar surveys in the future or to facilitate cost computations on proposals for amendment of the existing law.

One favorable aspect of the 1957 legislation was the change in the method of financing the State's obligation to the system. This has created larger revenues, more in keeping with the system's requirements. An improvement in the financial condition of the system should occur with its continued operation.

The results of the survey and valuation are presented in some detail. We shall be pleased to discuss with the Board any phase of this report or elaborate on any matters presented herein.

Respectfully submitted,

A. A. Weinberg
Actuary

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REPORT ON AN ACTUARIAL SURVEY AND VALUATION OF THE STATE EMPLOYEES' RETIREMENT SYSTEM OF MINNESOTA AS OF DECEMBER 31, 1957

There are presented herewith the results of an actuarial survey of the operating experience of the State Employees' Retirement System of Minnesota for the period from July 1, 1929 to December 31, 1957, and an actuarial valuation as of the beginning of business on January 1, 1958.

The survey was made pursuant to the provisions of an Act of the Legislature, approved May 2, 1957, which provides for periodic actuarial surveys of the public pension funds in operation in the State of Minnesota. Such survey is to include among other things, the following:

> "A census of each of active and deferred annuitant classes by attained age, sex and service. The census shall show number of members, their aggregate annual salary, their contributions for the past plan year, and their prospective retirement annuities under the plan.
>
> "A census of each of the classes of retired members, disabled members, and survivors of members by type of annuity, attained age, and sex (and duration where applicable). The census shall show number of retirants and amount of annual annuity payable as of the survey date.
>
> "An actuarial balance sheet showing assets, liabilities, and the deficit from full funding of liabilities.

"A statement of assumptions made in determining present values of benefits and contributions, including the following:

(a) Interest rate
(b) Mortality rates (before and after retirement)
(c) Withdrawal rate
(d) Salary scale
(

"Each actuarial survey shall include findings as to:

(a) The normal support rate required to adequately finance currently accruing liabilities.

(b) Such additional annual rate of support as is required to amortize the deficits found by the end of the fiscal year of the fund occurring in 1997."

An actuarial survey had been in prospect for the system for some time. The work of compiling a large volume of statistics regarding the operations of the system dating from the time of its establishment had been initiated about two years ago for the purpose of developing the information required for this type of survey.

BASIC FACTORS

The financial condition of a retirement system is established by the valuation of its assets and liabilities. Such a valuation is predicated upon certain basic factors such as conditions for retirement, rates of death, rates of separation from service, rates of disability, rates of retirement and rates of mortality among annuitants. These factors are applied to determine the cost of the retirement allowances and other benefits provided under the plan of operation.

The factor of age has an important bearing upon cost considerations. For example, a young entrant into the service will require larger total contributions than an older entrant because the younger entrant will be able to earn a larger retirement benefit. On the other hand, an employee in service at the date of inception of the system who is of an advanced age may require an immediate outlay of moneys to provide for his retirement, as contrasted with a younger employee in service for whom no contributions may be necessary because of the possibility that this employee may withdraw from service or die while in the service before reaching retirement age.

The age of retirement must also be considered in cost calculations. A low retirement age results in larger costs not only because of longer life expectancy but also because by early retirement such employees avoid the risk of health impairment that usually results from physical exertion at the advanced ages.

The factor of sex is also of importance because of the diverse physiological and economic conditions governing the two different sexes. Thus, marriage is a contributing factor in the rate of withdrawal from service of female employees. That women live longer than men is apparent from a study of mortality rates. Retirement annuities for women, therefore, require a larger outlay of moneys, not only because of their increased longevity but also because, on the average, women retire at earlier ages than men.

All of these factors are basic and interactive in a valuation of a retirement system. For example, a change in the death or withdrawal rates on active members will affect the present value of the retirement benefits unless the change is counter-balanced by the operation of other factors. Costs of retirement and other benefits, therefore, are dependent upon these forces.

Mortality

The rate of mortality experienced among members of a retirement system affects its financial operations in two diverse ways. If the number of deaths is lower than contemplated by the mortality standard in use, certain gains to the system accrue because a smaller amount of death benefits are payable. On the other hand, if more members survive at the age fixed for retirement than was anticipated, more pensions have to be paid and the result is higher pension cost. The increase in pension cost is greater than the saving in death benefit payments.

With respect to members already retired, if the rates of mortality are less than the expected according to the mortality table used to measure mortality among annuitants, a deficit results which must be met by larger contributions to the system. Conversely, if the rate of death among the annuitants is greater than the expected according to the assumed mortality table, a gain to the system occurs and a surplus is created. This surplus may be used as an additional reserve to meet future contingencies or applied as a credit on future contributions.

Turnover

Another important factor affecting current pension cost is employee turnover. While one of the objectives of a retirement system is to reduce employee turnover, and this is generally achieved in operations, there is usually a number of employees who leave the service with relatively short periods of employment and forfeit their accrued pension credits by accepting a refund of their contributions. On the other hand, the provision for the vesting of pension credit which has been provided in retirement plans during recent years has made it possible for some employees to leave the service and retain their rights in a future pension expectance. The factor of turnover is basic in the calculation of costs and liabilities of a retirement system. Annual valuations and periodic actuarial surveys are prescribed in order that a continuous check of the factor of turnover may be maintained. Thus, changes in the basic assumptions can be made without too long a delay if it appears that the results of operating experience dictate such changes.

Disability

The operating experience of a retirement system with disability incidents is subject to wide variations depending upon the types of provisions made and the character and degree of administration of disability claims. The policies of the governmental agency have a considerable bearing upon the number of disability claims to be processed by a retirement system and the payments to be made. Members disabled for the particular duties of their previously assigned position are frequently able to perform useful service in another capacity. If they are given other employment, the burden on account of disability claims is reduced. As a general rule, however, this is not done and the members are placed upon disability retirement.

For these and other reasons, established disability tables cannot be applied to the operations of a particular system with any degree of dependability as a measure of the number of disability incidents and the amount of claims to be paid. Where such tables are applied, they must be carefully reviewed and checked periodically in order that the forecast of costs and obligations that they reflect takes into account all present and prospective factors of both internal and external character influencing the incidence of claims for disability benefits and their continued payment.

Employment

The policies maintained by the employer relative to the employment of personnel must be carefully studied and evaluated as to their effect on the current operations of the system. These policies frequently affect the number of persons entering its service, the age and salary distribution of the new entrants, the rates of separation from service or rates of disability. Any major revisions in employment or fiscal policies of the governmental agency, therefore, may have an immediate or future effect on the course of operations of the retirement system and its financial status.

In an actuarial survey, these possibilities must be considered. If any of these factors are of sufficient scope to warrant adjustments or revisions in the financing provisions of the retirement system or in the qualifying conditions relating to the several benefits comprising the benefit schedule or rates of benefit, the necessary changes must be made. Such changes are imperative if the underlying plan governing the retirement system is to be maintained on a basis that will meet most effectively, in accordance with technical requirements, the peculiar needs of the governmental agency.

Interest

The factor of interest is also basic in the operation of a retirement system. All calculations of costs and liabilities are predicated upon the theory that the reserves of the system will be continuously invested in income-bearing securities at an assumed rate. Mortality tables used in the computation of annuities and reserves reflect an interest factor. Interest income accounts for a substantial part of the revenue of the system. Without this income, contribution rates necessary to meet these costs would be considerably higher.

The effect on cost of the income from invested assets is quite pronounced. Earnings on investments have a direct bearing on the amounts to be contributed to the retirement system. The larger the earnings, the smaller are the contribution requirements from the employees or employer, or both.

Earnings on invested reserves result in large savings in cost. The amount of these earnings depends upon two factors, namely: (1) the rate of income on investments, and (2) the length of service rendered by those qualifying for pension benefits. Assuming a fixed return of 2-1/2% per year and regular monthly contributions to the system, the interest earnings after a period of 30 years would be equal to 32.8 per cent of the total accumulated sum consisting of principal and interest, and after 25 years, to 27.9 per cent of such sum.

To illustrate further, an investment made over a period of 25 years at 3 per cent will produce 28 per cent more income than one made at 2-1/2 per cent for the same period. Likewise, an investment made at 3-1/2 per cent for 25 years would produce 25 per cent more income than one made at 3 per cent for the same period of time.

The rate of interest used in calculations for the purposes of this survey is 3 per cent per annum. It was assumed that under the existing investment authority, the system should earn the aforesaid rate on its invested assets.

Salary

Since the retirement annuities payable by the system are based upon the average salary of a member for a prescribed period, it is necessary for the correct calculation of costs and liabilities, that future increases in salary be taken into account. The accrued liabilities of the system at any given date, representing the present value of future pension expectancies, must reflect increases due to changes in salary that will occur prior to the time when the annuities become payable. Generally a salary scale is prepared showing the rates of salary that will be in effect at various ages until the prescribed minimum ages of retirement, on the assumption that as a member progresses in service towards retirement, his salary will be continuously increased in accordance with the rates assumed in the salary scale.

In cost determinations, the salary scale is generally applied in terms of an average salary relationship between the present age of the member and the assumed average at retirement. For example, if the salary scale rate at age 25 for a male member is $2,480 and at age 60 $3,909, it is assumed that the member now 25 years of age will at age 60 be earning 3,909/2480ths of this rate of salary at age 25.

The relationship between ages may be unaffected in a salary scale by an over-all increase in salary for the employees on a fixed percentage basis uniformly applied. However, the total pension cost for the system in terms of a dollar amount would be increased because pension cost generally follows the trend in salaries particularly if the retirement annuities are predicated upon salaries or if employer contributions are made upon the basis of employees' earnings. But under a fixed percentage rate of increase uniformly for all employees, salary scale relationships between ages may remain at substantial parity and the salary scale may continue to be used effectively even though rates of salary have increased.

STATISTICAL DATA

Active Members

	Male	Female	Totals
Number	16,843	11,125	27,968
Per cent of total	60.2%	39.8%	100.0%
Total annual salaries	$55,657,559.00	$28,488,298.00	$84,145,857.00 — aver. sal on which deductions made to 1/1/58
Average salary	$3,304.00	$2,561.00	$3,009.00
Average age	40.4	38.0	39.4
Average membership service	6.8 yrs.	6.3 yrs.	6.6 yrs.
Prior Service			
Number of members	621	266	887
Per cent of total	70.0%	30.0%	100.0%
Average age	58.6	57.9	58.4
Average prior service	5.5 yrs.	4.9 yrs.	5.3 yrs.

Active Members - continued

	Male	Female	Total
Inactive Members with vested rights			
Number	328	183	511
Per cent of total	64.2%	35.8%	100.0%
Average age	50.9	49.9	50.6
Average service	11.3	10.0	10.9
Inactive Members - No vesting			
Number	5,318	1,490	6,808
Per cent of total	78.1%	21.9%	100.0%
Average age	35.0	36.6	35.3
Average contributions	$22.22	$36.83	$25.42
Summary of statistics for exposure study - 7/1/1929 to 12/31/1957			
Number at July 1, 1929	5,518	1,710	7,228
New entrants	70,663	55,155	125,818
Withdrawals -			
Deaths in service	1,938	331	2,269
Service retirements	2,134	726	2,860
Disability retirements	78	22	100
Separations with refunds	49,547	42,988	92,535

Annuitants

	Number	Average Annual Payment	Average Age
Retirement Annuities:			
Male	17	$3,564.00	67.6
Female	8	3,540.00	66.8
Superannuation:			
Male	151	$ 889.00	80.9
Female	59	698.00	80.4
Proportional:			
Male	72	$ 634.00	69.6
Female	44	528.00	70.5
Partial:			
Male	39	$ 272.00	76.8
Female	18	217.00	74.9
Retirement Allowance:			
Male	961	$1,316.00	69.9
Female	453	1,077.00	69.7
Disability:			
Male	30	$ 964.00	62.7
Female	11	793.00	64.3
Reversionary - Female	15	$ 980.00	63.9
Optional Annuities	5	$2,020.15	66.0

Annuitants - continued

	Number	Average Annual Payroll	Average Age
Prospective Reversionary Annuities:			
Male members	37	$594.10	Member 68.8 Benef. 63.7
Female members	1	776.04	Member 62.0 Benef. 76.0
Survivors' Benefits:			
Widows (36) Widower (1)	37	881.00	55.4
Children (Male 11 - Female 15)	26	642.00	13.0

Summary of statistics on exposure
Study July 1, 1929 to December 31, 1957

	Male	Female	Totals
Number of retirements:			
Service	2,134	726	2,860
Disability	78	22	100
Number of deaths:			
Service	889	144	1,033
Disability	48	11	59

ACTUARIAL SURVEY

An actuarial survey of the mortality and service experience of the system covering the period from July 1, 1929 to December 31, 1957 was completed following the close of the year.

Life and service tables were prepared reflecting the operating experience for the aforesaid period. These are reproduced as a part of this report. A life and service table records the operating experience with respect to such factors as death, separations from service without right to a retirement annuity, and retirements for service and disability. These factors are derived from the experience of the past and are adjusted to give effect to the probable operating experience in future years.

Thus, the actuarial functions produced by the life and service table reflect closely the expected future trends and conditions. An actuarial valuation resulting from the application of these functions records the financial condition of the system at a given date giving effect as fully as possible developments that may occur in future years in the operation of the system in respect to the several basic factors.

In the process of arriving at the final or refined rates of separation from service, referred to above, graphic charts were prepared to which were transcribed the actual rates of separation caused by these factors as tabulated from the original statistical data relating to the experience among the group of employees covered by this survey. With the use of these graphs, the rates established in the original tabulations were adjusted and refined by the elimination of extreme fluctuations from the indicated primary trend. The graduated rates produced from a reading of these graphs were then used in the preparation of the life and service tables.

Separations from service without right to retirement benefit

The experience among the members of the system with respect to separations from the system by the acceptance of refunds was tabulated and analyzed. In the refinement of these statistics for the preparation of actuarial functions, effect was given to the conditions of the service prevailing at this time and to possible variations in future years.

The following table presents a comparison of the rates of separation established on the basis of the operating experience of the system from July 1, 1929 to December 31, 1957.

Rates of Separation with the Acceptance of Refund Benefits
(per 1,000 members)

Age	Male	Female
20	199.3	191.4
25	156.9	186.2
30	123.7	179.9
35	101.2	169.1
40	83.4	154.7
45	74.3	139.5
50	67.9	124.2

Mortality among active members

The following table illustrates the rates of death experienced among the members in active service in comparison with the rates shown by other established mortality tables used for the measurement of life insurance and group insurance risks.

Rates of death per 1,000 members

	Present Survey		1937 Standard Annuity Mortality Table		United States Life Tables 1949-1951	
Age	Male	Female	Male	Female	Male	Female
20	0.9	0.8	1.3	1.3	1.8	0.9
25	1.2	1.0	1.6	1.3	2.0	1.1
30	1.6	1.3	2.1	1.6	2.1	1.5
35	2, 2	1.9	3.0	2.1	2.9	2.0
40	3.2	2.9	4.4	3.0	4.4	3.0
45	4.9	4.3	6.4	4.4	7.0	4.5
50	7.7	6.1	9.3	6.4	11.0	6.6
55	11.4	24.3	13.6	9.3	16.9	9.7

Mortality among service retirants

The mortality experience among service retirants has shown diverse trends. For male individuals, mortality has approximately equalled those contemplated by the 1937 Standard Annuity Mortality Table. In the case of female pensioners, the mortality has been considerably higher, as will be noted below:

Rates of death per 1,000 retired members

Age	Rates established by this survey		1937 Standard Annuity Mortality Table	
	Male	Female	Male	Female
60	22.2	28.7	19.8	14.3
65	30.0	33.8	28.8	19.8
70	39.7	70.5	41.8	28.8
75	56.8	100.7	60.5	41.8
80	82.7	143.8	87.2	60.5

A study of the mortality experience for the last several years discloses a much lower mortality among the female annuitants, more in keeping with the general trend. Accordingly, we have used for this survey as a measure of mortality among the annuitants, the 1937 Standard Annuity Mortality Table and 3% interest.

Mortality among disability retirants

The number of male disability pensioners was too small to be used reliably for a mortality study among this group of beneficiaries. However, rates were derived based upon the system's limited experience and the results are presented in the following table showing a comparison with other mortality standards.

Rates of death per 1,000 members

Age	Rates established by this survey	American Men Mortality Table	United States Life Tables 1949-1951
45	4.5	7.9	4.5
50	6.6	11.6	6.6
55	10.0	17.5	10.0
60	14.6	26.7	14.6
65	21.8	44.2	21.8
70	34.8	61.5	34.8
75	56.6	91.9	56.6
80	90.0	135.7	90.0

TABLE A

LIFE AND SERVICE TABLE FOR AGES 20 TO 60

M A L E

Age	Annual Rates of With-drawal	Death	Disa-bility	Number in Service	Number of With-drawals	deaths	Disa-bilities
20	.199333	.000905	.000017	1,000,000	199,333	905	17
21	.190494	.000948	.000017	799,745	152,347	758	14
22	.181656	.000994	.000018	646,626	117,463	643	12
23	.172817	.001044	.000018	528,508	91,335	552	10
24	.163978	.001099	.000019	436,611	71,595	480	8
25	.156897	.001159	.000020	364,528	57,193	422	7
26	.149815	.001223	.000021	306,906	45,979	375	6
27	.141984	.001294	.000022	260,546	36,993	337	6
28	.134154	.001373	.000023	223,210	29,945	306	5
29	.128852	.001459	.000024	192,954	24,863	282	5
30	.123714	.001551	.000025	167,804	20,760	260	4
31	.119210	.001653	.000026	146,780	17,498	243	4
32	.114716	.001764	.000027	129,035	14,802	228	3
33	.110223	.001885	.000028	114,002	12,566	215	3
34	.105729	.002014	.000029	101,218	10,702	204	3
35	.101236	.002151	.000030	90,309	9,143	194	3
36	.096743	.002348	.000033	80,969	7,833	190	3
37	.092249	.002551	.000036	72,943	6,729	186	3
38	.088984	.002770	.000039	66,025	5,875	183	3
39	.085244	.002997	.000043	59,964	5,112	180	3
40	.083388	.003236	.000046	54,669	4,559	177	3
41	.081530	.003487	.000049	49,930	4,071	174	2
42	.079673	.003811	.000053	45,683	3,640	174	2
43	.077866	.004150	.000057	41,867	3,258	174	2
44	.075959	.004504	.000071	38,433	2,919	173	3
45	.074332	.004875	.000085	35,338	2,627	172	3
46	.072705	.005416	.000099	32,536	2,366	176	3
47	.071078	.005955	.000119	29,991	2,132	179	4
48	.069450	.006513	.000154	27,676	1,922	180	4
49	.068673	.007093	.000189	25,470	1,749	181	5
50	.067896	.007695	.000223	23,535	1,598	181	5
51	.067009	.008324	.000252	21,751	1,458	181	5
52	.066120	.009054	.000282	20,107	1,329	182	6
53	.065233	.009814	.000337	18,590	1,213	182	6
54	.064526	.010607	.000392	17,189	1,109	182	7
55	.063819	.011438	.000448	15,891	1,014	182	7
56	.063112	.012305	.000513	14,688	927	181	8
57	.062404	.013214	.000563	13,572	847	179	8
58	.061833	.016836	.000613	12,538	775	211	8
59	.061261	.017959	.000663	11,544	707	207	8
60	--	--	--	10,622	--	--	--

TABLE B

LIFE AND SERVICE TABLE FOR AGES 20 TO 60

F E M A L E

Age	Annual Rates of With-drawal	Annual Rates of Death	Annual Rates of Disa-bility	Number in Service	Number of With-drawals	Number of Deaths	Number of Disa-bilities
20	.191442	.000847	.000019	1,000,000	191,442	847	19
21	.190571	.000880	.000019	807,692	153,923	711	15
22	.189513	.000916	.000019	653,043	123,760	598	12
23	.188455	.000953	.000020	528,673	99,631	504	11
24	.187397	.000992	.000020	428,527	80,305	425	9
25	.186189	.001034	.000021	347,788	64,754	360	7
26	.185282	.001079	.000022	282,667	52,373	305	6
27	.184224	.001128	.000023	229,983	42,368	259	5
28	.183166	.001181	.000024	187,351	34,316	221	4
29	.182108	.001238	.000025	152,810	27,828	189	4
30	.179943	.001301	.000033	124,789	22,455	162	4
31	.177778	.001368	.000041	102,168	18,163	140	4
32	.175613	.001491	.000049	83,861	14,727	125	4
33	.173448	.001620	.000061	69,005	11,969	112	4
34	.171278	.001764	.000073	56,920	9,749	100	4
35	.169119	.001916	.000085	47,067	7,960	90	4
36	.166954	.002076	.000097	39,013	6,513	81	4
37	.163900	.002246	.000113	32,415	5,313	73	4
38	.160847	.002425	.000129	27,025	4,347	66	3
39	.157793	.002658	.000145	22,609	3,568	60	3
40	.154740	.002901	.000161	18,978	2,937	55	3
41	.151686	.003151	.000177	15,983	2,424	50	3
42	.148633	.003411	.000193	13,506	2,007	46	3
43	.145579	.003680	.000209	11,450	1,667	42	2
44	.142526	.003960	.000225	9,739	1,388	39	2
45	.139472	.004282	.000241	8,310	1,159	36	2
46	.136419	.004619	.000355	7,113	970	33	3
47	.133366	.004967	.000469	6,107	814	30	3
48	.130312	.005330	.000559	5,260	685	28	3
49	.127259	.005709	.000650	4,544	578	26	3
50	.124205	.006105	.000740	3,937	489	24	3
51	.121152	.006502	.000831	3,421	414	22	3
52	.118098	.006918	.000921	2,982	352	21	3
53	.115045	.007354	.001012	2,606	300	19	3
54	.111991	.007815	.001102	2,284	256	18	3
55	.108947	.024279	.001193	2,007	219	49	2
56	.102002	.025105	.001283	1,737	177	44	2
57	.095395	.025950	.001316	1,514	144	40	2
58	.087787	.026832	.001363	1,328	117	36	2
59	.086051	.027735	.001365	1,173	101	33	2
60	--	--	--	1,037	--	--	--

TABLE C

LIFE AND RETIREMENT TABLE FOR AGES 60 TO 70

MALE

Age	Annual Rates of Death	Annual Rates of Retirement	Number in Service	Number of Deaths	Number of Retirements
60	.022259	.006661	1,000,000	22,259	6,661
61	.023679	.008147	971,080	22,994	7,911
62	.025157	.008999	940,175	23,652	8,461
63	.026700	.010091	908,062	24,245	9,163
64	.028310	.021448	874,654	24,761	18,760
65	.029996	.032805	831,133	24,931	27,265
66	.031761	.044162	778,937	24,740	34,399
67	.033610	.055519	719,798	24,192	39,962
68	.035552	.066876	655,644	23,309	43,847
69	.037592	.079765	588,488	22,122	46,941
70	--	1.000000	519,425	--	519,425

FEMALE

Age	Annual Rates of Death	Annual Rates of Retirement	Number in Service	Number of Deaths	Number of Retirements
60	.028664	.011010	1,000,000	28,664	11,010
61	.029616	.013121	960,326	28,441	12,600
62	.030598	.017613	919,285	28,128	16,191
63	.031607	.023008	874,966	27,655	20,131
64	.032649	.046008	827,180	27,007	38,057
65	.033758	.069009	762,116	25,728	52,593
66	.038188	.092009	683,795	26,113	62,915
67	.048190	.115009	594,767	28,662	68,404
68	.058240	.152720	497,701	28,986	76,009
69	.064333	.203840	392,706	25,264	80,049
70	--	1.000000	287,393	--	287,393

LIFE TABLE FOR AGES 70 AND OVER

M A L E

Age	Rate of Death	Number of Retirants	Number of Deaths
70	.039737	1,000,000	39,737
71	.041995	960,263	40,326
72	.044375	919,937	40,822
73	.048381	879,115	42,532
74	.052526	836,583	43,942
75	.056819	792,641	45,037
76	.061273	747,604	45,808
77	.066343	701,796	46,559
78	.071597	655,237	46,913
79	.077043	608,324	46,867
80	.082693	561,457	46,429
81	.090046	515,028	46,376
82	.097631	468,652	45,755
83	.105463	422,897	44,600
84	.113555	378,297	42,958
85	.121924	335,339	40,886
86	.130584	294,453	38,451
87	.139556	256,002	35,727
88	.148847	220,275	32,787
89	.158480	187,488	29,713
90	.169242	157,775	26,702
91	.180381	131,073	23,643
92	.191882	107,430	20,614
93	.203784	86,816	17,692
94	.216099	69,124	14,938
95	.257950	54,186	13,977
96	.310176	40,209	12,472
97	.362393	27,737	10,052
98	.416382	17,685	7,364
99	.472271	10,321	4,874
100	.530269	5,447	2,888
101	.590855	2,559	1,512
102	.654434	1,047	685
103	.743638	362	269
104	.800000	93	74
105	.833333	19	16
106	1.000000	3	3

LIFE TABLE FOR AGES 70 AND OVER

F E M A L E

Age	Rate of Death	Number of Retirants	Number of Deaths
70	.070476	1,000,000	70,476
71	.075349	929,524	70,039
72	.081050	859,485	69,661
73	.087161	789,824	68,842
74	.093709	720,982	67,563
75	.100723	653,419	65,814
76	.108229	587,605	63,596
77	.116257	524,009	60,920
78	.124837	463,089	57,811
79	.134000	405,278	54,307
80	.143786	350,971	50,465
81	.154211	300,506	46,341
82	.165320	254,165	42,019
83	.177138	212,146	37,579
84	.189709	174,567	33,117
85	.203062	141,450	28,723
86	.217216	112,727	24,486
87	.232198	88,241	20,489
88	.248059	67,752	16,806
89	.264796	50,946	13,490
90	.283515	37,456	10,619
91	.305778	26,837	8,206
92	.331840	18,631	6,183
93	.362122	12,448	4,508
94	.397579	7,940	3,157
95	.438921	4,783	2,099
96	.487276	2,684	1,308
97	.542279	1,376	746
98	.610442	630	385
99	.690722	245	169
100	.800000	76	62
101	.833000	14	12
102	1.000000	2	2

ACTUARIAL VALUATION

A retirement system represents a long term operation which involves a steady and persistent increase in benefit payments. The system experiences a small outlay during its early years but the expenditures increase steadily until considerably higher levels of disbursements are reached as the system expands its operations. An actuarial valuation is made for the purpose of computing the liabilities under the prescribed benefit schedule and ascertaining if these liabilities will be met by the expected revenues under the prescribed method of financing.

As previously stated, this valuation is made with the use of the actuarial functions produced in the survey of the operating experience of the system in prior years. In establishing these functions, it is assumed that the operations of the system in respect to such factors as rates of mortality among active and retired members, rates of separation with refunds, salary increments and investment earnings, will be duplicated in future years. It is the responsibility of the actuary to properly evaluate the results of the past and possibly modify his findings with the view of establishing functions for future valuations which will realistically reflect the assumed experience under conditions that may be expected to exist in future years.

Long range valuations or cost estimates, regardless how determined, cannot be precise no matter how accurately they may have been calculated. There are bound to be differences between actual experience in operations over the long term and in the assumptions made with respect to the several actuarial factors used as a basis in such determinations. Nevertheless, valuations and cost determinations must be made in order that an indication may be had regarding the accrued and accruing financial obligations under the retirement system and to illustrate cost trends. This is especially important in retirement systems where, either because of the character of the membership or the types of benefit provisions, costs will increase materially in future years as compared with the small expenditures incurred during the early years of the system's existence.

Types of valuations

Two different methods are used in making an actuarial valuation. One consists of projecting the income and disbursements for a period of years taking into account in such projection membership trends, separations, mortality and other relevant factors bearing upon the future course of operations of the retirement system. The second method is to set up the assets and liabilities of the system as of a given date, both accrued and prospective. From the latter method future contribution rates are computed which may prove sufficient to discharge the benefit liabilities over the expected working lifetime of the members.

Each of these two methods has certain advantages and disadvantages. The principal feature of the projection method is that a graphic and more understandable presentation of what may happen in the future is possible. The second method involves the preparation of a balance sheet and is easier to apply because of the fewer assumptions made as to the probable future experience.

Under either method, costs are figured into perpetuity because of the assumption of a continuous flow of new members into the system to replace those who have retired, died or have otherwise become separated from service, and of probable increases in total membership. The balance sheet method is probably more difficult to understand because it includes the presentation of a technical financial statement reflecting actuarial techniques. That method generally provokes the comment that the figures embodied therein are only actuarial costs and do not represent real costs. This viewpoint is erroneous because the figures c onstitute actual costs and liabilities, actuarially determined.

It must be assumed that the system will continue in existence at least until it has discharged in full its obligations to all members thereof, both retired and active, disregarding for the moment prospective future entrants. The incorrect interpretation of the actuarial balance sheet probably arises from the fact that the ultimate cost figures and the accumulated assets of the system, as compared to current benefit payments, are so much larger than the amounts of benefits currently being paid.

An actuarial valuation of the system has been completed as of the commencement of business on January 1, 1958, according to the balance sheet method and the results are presented in the succeeding pages.

RESULTS OF VALUATION

The total accrued liability consists of the following items:

1. Actuarial value of service retirement, Disability and survivors' benefits	$22,049,044.00
2. Earned pension credits of active members covering service rendered prior to January 1, 1958	37,553,450.00
Total	$59,602,494.00

To meet the foregoing accrued liability, the system has net assets of $42,323,450.00, of which $9,448,131.00 is allocated for future payments of refunds and death benefits from member contributions. The net available assets, therefore, to meet the accrued liabilities, at January 1, 1958, was 32,875,319.00.

Applying these available assets against the total accrued liability results in an unfunded accrued liability amounting to $26,727,175.00.

To amortize this liability over a period of 40 years, assuming interest at 3% per annum, will require the sum of $1,156,281.00 per year. This is equal to 1.374% of annual payroll.

A computation was also made of the liability for pension credits to be earned by active members during their assumed future service until their expected retirement. The purpose of this computation is to show the full amount of liability to be incurred in the future on account of such members under the present plan of operation. This liability at January 1, 1958 amounted to $21,245,824.00, being the discounted value at such date of the prospective future credits after giving effect to the factors of mortality, separation and interest.

The present value of future contributions by the active members towards this prospective liability, at 3% of salary, is $9,805,765.00. The present value of the public's share of the liability for future service is $11,440,059.00.

The normal rate required to finance currently accruing liabilities as a percentage of payroll is as follows:

Male members	5.835%
Female members	7.164%
Combined	6.285%

Since this cost is to be shared by the members and the State of Minnesota, with the members contributing 3% of salary, the contribution by the State would be 3.285%.

VALUATION BALANCE SHEET

A valuation balance sheet, embodying the results of the computation of reserves and liabilities, is presented in the succeeding pages. The technique used in the preparation of this statement is similar to that followed by accountants in the preparation of a financial balance sheet, except that a valuation balance sheet is broader in scope. It includes, in addition to the current liabilities, the actuary's evaluation of the accrued and prospective liabilities, and the present and prospective assets, actuarially determined.

A sound financial condition exists from the actuarial standpoint when assets are on hand equal to the difference between (1) the total of all accrued and prospective liabilities, and (2) the present value of future contributions to be received by the system. This is commonly referred to as the actuarial reserve.

The valuation balance sheet, showing the financial condition of the system at January 1, 1958, is presented in the following pages.

VALUATION BALANCE SHEET - JANUARY 1, 1958
(at beginning of operations)

A S S E T S

PRESENT ASSETS		
Net present assets	$42,323,450.00	
Less, releases of member contributions on account of separation prior to retirement	9,448,131.00	$32,875,319.00
DEFERRED ASSETS		
Obligation of members and the State of Minnesota for retirement and disability annuities covering service of the members for the remainder of their working lifetime after December 31, 1957		
Members -		
Male	$ 6,679,165.00	
Female	3,126,600.00	
State of Minnesota	11,440,059.00	21,245,824.00
UNFUNDED ACCRUED LIABILITY		
Deferred obligation of the State of Minnesota for unfunded accrued liabilities on account of retirement and disability annuities covering service prior to January 1, 1958		26,727,175.00
TOTAL		$80,848,318.00

VALUATION BALANCE SHEET - JANUARY 1, 1958
(at beginning of operations)

LIABILITIES

ACCRUED LIABILITIES

Present value of annuities entered upon and in force -		
Retirement Annuities	$ 928,915.00	
Superannuation	1,067,031.00	
Proportional	653,367.00	
Partial	108,231.00	
Full Retirement Allowance	17,283,805.00	
Revised Retirement Allowance	487,748.00	
Disability	464,814.00	
Reversionary	203,539.00	
Optional Annuities	137,070.00	
Widows' & Children's Benefits	601,424.00	$21,935,944.00
Present value of prospective reversionary annuities		113,100.00
Present value of retirement and disability annuities on active members covering service prior to July 1, 1929		
Male	1,533,973.00	
Female	601,410.00	2,135,383.00
Present value of retirement and disability annuities on active members covering service July 1, 1929 to January 1, 1958		
Male	23,046,864.00	
Female	12,371,203.00	35,418,067.00

PROSPECTIVE LIABILITIES

Present value of retirement and disability annuities on active members covering service after December 31, 1957		
Male	13,258,559.00	
Female	7,987,265.00	21,245,824.00
TOTAL		$80,848,318.00

CONCLUDING COMMENT

Coordination of the system with federal social security represents a forward step in its operation. A more comprehensive schedule of benefits has been established providing a greater measure of security for all members. The established schedule conforms to current concepts and policies governing retirement planning for public employees. The provisions for financing appear to be adequate. The method prescribed by the law for budgeting costs among the participating departments and divisions of the State government reflects sound principles for the financing of pension obligations.

The changes in internal administrative policies and procedures instituted during recent years have resulted in improved operating methods, reflecting modern standards. A high standard of efficiency in current operations has developed and is being maintained. The administrative procedures in force meet every test of adequacy.

Respectfully submitted,

A. A. Weinberg
Actuary

A P P E N D I X

Summary of Benefit and Contribution Provisions

Statistical Tables

SUMMARY OF BENEFIT AND CONTRIBUTION PROVISIONS OF STATE EMPLOYEES RETIREMENT ACT

(In force January 1, 1958)

SERVICE RETIREMENT

Conditions for retirement

Retirement is optional with a member beginning upon attainment of age 58, with at least 20 years of credited service, of which at least 10 years were as a member of the Association.

Retirement is optional with a member beginning upon attainment of age 65, with at least 10 years of credited service as a member of the Association.

Retirement is compulsory upon attainment of age 70.

Amount of service retirement annuity

The amount of retirement annuity is equal to the following percentage rates for the respective periods of allowable service, based upon "average salary" as defined below:

(a) 1st 10 years - 5/8 of 1% per year of such service
(b) 2nd 10 years - 7/8 of 1% per year of such service
(c) 3rd 10 years - 1-2/3 of 1% " " " " "
(d) Over 30 years - 1-3/4 of 1% " " " " "

Average salary defined

Average salary for service prior to July 1, 1957 is the average of the highest salary upon which salary deductions were based for any 5 consecutive years prior to such date.

Average salary for service after June 30, 1957 is the average salary for such entire period of service on which salary deductions were based not exceeding in any one year $4,800.00.

Retirement before age 65

Upon retirement prior to age 65, the retirement annuity is to be the actuarial equivalent, at the age of retirement, of the value of the annuity at age 65.

Any member who retires before he becomes entitled to old age and survivors primary insurance benefit payments may elect to receive from the system a retirement benefit greater than his normal retirement annuity, from the date of retirement to the date when he becomes entitled to social security benefits, and a smaller amount thereafter. This annuity shall be actuarially equated and the calculation thereof shall take into account the anticipated social security primary insurance benefit.

Options

Any member may elect to receive the full service retirement annuity, or in lieu thereof, any of the following optional forms of annuity, on an actuarial equivalent basis:

Option 1 - 5 years certain and life

Option 2 - 10 years certain and life

Option 3 - 15 years certain and life

Option 4 - 20 years certain and life

Option 5 - Joint and last survivor annuity (same amount for member and beneficiary)

Option 6 - Joint and last survivor annuity (1/2 of the member's reduced annuity to beneficiary)

Vesting

Any member having at least 10 years of service, who withdraws from service prior to age 65, may elect to receive a refund of his accumulated salary deductions, or a deferred retirement annuity payable beginning at age 65.

DISABILITY RETIREMENT

Conditions for retirement

Upon total and permanent disability after at least 10 years of credited service if under age 50, or at age 50 or over regardless of length of service.

If service of the member had terminated at any time at least 5 of the required 10 years of allowable credited service must have been rendered since the member's latest re-entry into State service.

Waiting period

Payments begin to accrue after 90 days from date of disability unless the member is receiving salary for sick leave or other cause for more than 90 days, in which event benefit payments accrue from the date salary has ceased.

If written application has not been filed within 90 days from date of disability, payments begin as of the date 30 days prior to the date of application, provided that if the member received salary during said 30-day period, payments accrue from the date of cessation of salary.

Amount of benefit

The disability benefit is equal to $90.00 per month until the member attains age 50. Thereafter, he shall receive the amount prescribed for service retirement without actuarial discount, plus social security.

Offset

The benefit is likewise subject to reduction by any amounts received or receivable by the member from the State under applicable workmen's compensation laws.

DEATH BENEFITS

Death before retirement

Upon death before retirement, the designated beneficiaries of the member or his legal representative, as the case may be is entitled to a refund of his accumulated contributions, plus interest credits.

Except as to an option selected by a member as herein provided, no survivors benefits are payable to a surviving spouse or dependent children. These are provided by federal social security.

Death after retirement

Upon death after retirement, the death benefit consists of such amount as is payable under the optional form of annuity selected by the member at the time of or prior to retirement.

REFUNDMENTS

Conditions for payment

Termination of service as an employee from all positions in the State service.

Amount of payment

The refundment is equal to the amount of the accumulated deductions, without interest.

Repayment of refundments

Upon re-entry into service, and the completion of 5 years of credited service, a member may repay all refundments plus interest at 4% per annum compounded annually,

FINANCING

Members' deposits

Members contribute by way of salary deductions 3% of salary not exceeding salary of $4,800.00 per year.

Employer's contributions

The employer is required to contribute an amount equal to the total deductions from the members' salaries, plus an additional amount on salaries not to exceed a salary of $4,800.00 in any calendar year, equal to the following percentages for the years specified;

Years	1957 to 1959	inclusive	-	2%
"	1960 to 1964	"	-	1-1/2%
"	1965 to 1969	"	-	1%
"	1970 to 1974	"	-	½ of 1%
"	1975 & over		-	None

Savings provision

Any person who on July 1, 1957 had 10 or more years of allowable service as a member, and who at the date of retirement, does not qualify for old age and survivors primary insurance benefits, shall have the option of receiving the annuity as described herein or the annuity provided under the superseded law, namely, Section 352.11 of the Minnesota Statutes of 1953, as amended by Chapter 239, laws of 1955.

Any person who on July 1, 1957, had 10 or more years of allowable service as a member, shall receive at retirement, in addition to the annuity herein described, an amount which when added to his old age and survivors insurance primary benefit is equal to the annuity he would have received under the statutes referred to in the preceding paragraph.

Upon death of an annuitant who retired prior to July 1, 1957, the beneficiary or estate of the annuitant, shall be entitled to the benefit payable under the law in force at the date of the annuitant's retirement, under the conditions therein prescribed.

Any person whose services terminated prior to July 1, 1957, having a contribution credit in the system, shall be entitled to the rights and benefits prescribed by the law in effect at the date of termination of service as a State employee.

TABLE 1

Number of Active Members Classified by Age at December 31, 1957 and Annual Salaries

M A L E

Age	Number	Annual Salaries	Membership Service Credit	Age	Number	Annual Salaries	Membership Service Credit
15	4	$ 6,091	3	50	308	$1,167,933	2,866
16	65	98,971	34	51	356	1,322,209	3,607
17	227	345,639	127	52	316	1,226,994	2,905
18	425	647,122	234	53	329	1,303,107	3,315
19	547	696,142	874	54	299	1,106.625	3,141
20	510	874,235	1,389	55	308	1,219,930	3,229
21	423	741,580	1,116	56	283	1,117,234	2,954
22	450	812,291	1,149	57	377	1,547,288	3,523
23	422	805,590	1,122	58	286	1,091,937	3,547
24	338	754,969	1,217	59	288	1,148,194	3,164
25	380	942,543	1,410	60	289	1,129,662	3,470
26	352	1,019,369	1,249	61	291	1,088,353	3,735
27	398	1,302,470	1,504	62	282	1,080,327	3,325
28	371	1,238,201	1,478	63	265	1,053,056	3,205
29	329	1,106,573	1,388	64	232	828,524	3,036
30	305	1,077,341	1,320	65	211	780,929	2,677
31	349	1,305,275	1,422	66	159	578,148	1,939
32	319	1,226,216	1,406	67	139	530,697	1,809
33	340	1,320,184	1,659	68	121	394,405	1,582
34	296	1,107,053	1,552	69	115	422,638	1,325
35	308	1,155,934	1,481	70	73	269,231	1,152
36	322	1,250,291	1,606	71	42	117,812	439
37	319	1,222,073	2,001	72	28	115,266	203
38	290	1,141,103	1,709	73	27	64,515	244
39	323	1,262,564	1,964	74	17	67,554	154
40	301	1,074,938	1,988	75	8	25,453	93
41	298	1,133,883	1,776	76	7	36,543	38
42	267	950,049	1,741	77	10	58,048	103
43	286	1,058,510	2,024	78	3	7,869	69
44	267	1,012,461	2,031	79	3	15,544	45
45	292	1,122,429	2,219	80	2	4,415	72
46	305	1,215,969	2,497	81	4	8,935	36
47	309	1,207,839	2,608	84	1	1,987	23
48	310	1,288,238	2,682				
49	317	1,202,061	2,988	TOTALS	16,843	$55,657,559	113,993

TABLE 2

Number of Active Members Classified by Age
at December 31, 1957 and Annual Salaries

F E M A L E

Age	Number	Annual Salaries	Membership Service Credit
16	9	$ 16,949	2
17	70	131,825	31
18	508	956,673	260
19	547	961,743	920
20	474	914,984	838
21	444	867,992	1,170
22	428	963,009	1,116
23	405	911,259	1,476
24	326	825,696	1,295
25	285	711,339	1,385
26	240	607,875	1,200
27	205	529,308	1,075
28	191	493,160	982
29	180	497,956	910
30	176	458,759	892
31	163	821,752	913
32	154	382,479	771
33	157	380,278	867
34	136	357,840	786
35	148	394,873	902
36	191	514,296	1,033
37	178	459,595	1,188
38	155	384,963	927
39	180	489,103	1,065
40	195	505,886	1,201
41	155	421,172	1,069
42	178	485,857	1,276
43	195	513,079	1,383
44	197	586,161	1,521
45	218	586,997	1,759
46	194	510,448	1,443
47	246	638,195	1,924
48	235	681,892	1,881
49	224	638,957	1,998
50	237	$ 646,900	2,042
51	279	751,249	2,245
52	209	606,448	1,766
53	209	591,030	1,915
54	232	638,957	2,002
55	216	624,104	2,140
56	196	532,579	1,982
57	208	611,219	1,918
58	178	498,988	1,894
59	181	536,329	1,992
60	129	363,213	1,411
61	137	402,582	1,550
62	157	436,258	1,988
63	101	290,585	1,243
64	93	277,859	1,252
65	110	319,183	1,555
66	71	202,527	887
67	64	195,936	706
68	48	137,510	701
69	40	112,132	529
70	18	46,918	307
71	13	31,008	207
72	3	7,045	62
73	4	11,754	27
74	2	5,213	17
76	2	6,295	25
80	1	2,127	2
TOTALS	11,125	$28,488,298	69,824

TABLE 3

Number of Active Members with Prior Service Credit at December 31, 1957

Male			Female		
Age	Number	Years of Prior Service Credit	Age	Number	Years of Prior Service Credit
44	-	-	44	1	1
46	2	2	46	-	-
47	7	12	47	4	3
48	7	7	48	7	19
49	13	21	49	6	11
50	17	37	50	9	17
51	30	88	51	13	42
52	23	73	52	13	38
53	27	111	53	14	32
54	31	131	54	14	63
55	32	127	55	14	72
56	33	157	56	18	89
57	44	265	57	15	59
58	52	354	58	18	125
59	37	221	59	12	75
60	39	233	60	11	63
61	44	249	61	12	77
62	26	160	62	18	114
63	27	138	63	13	101
64	28	177	64	14	68
65	27	219	65	18	90
66	20	92	66	10	58
67	13	79	67	3	26
68	17	158	68	4	28
69	10	74	69	2	19
70	6	118	70	2	10
71	1	3	71	1	2
72	-	-	TOTALS	266	1,302
73	3	30			
74	1	18			
77	1	12			
78	1	17			
79	1	7			
81	1	1			
TOTALS	621	3,391			

TABLE 4

Number of Active Pay-back Members
and Annual Salaries at December 31, 1957

MALE

Age	Number	Annual Salaries
27	5	$ 16,766.00
28	5	19,263.14
29	2	7,698.00
30	5	21,044.00
31	7	32,215.64
32	11	43,660.86
33	9	43,705.00
34	9	43,639.00
35	9	41,652.00
36	9	43,408.40
37	13	56,886.42
38	9	43,248.00
39	12	56,149.66
40	17	78,949.92
41	5	20,262.22
42	14	63,735.00
43	10	46,500.98
44	12	59,554.86
45	15	72,763.54
46	22	109,449.42
47	17	83,229.84
48	26	122,685.38
49	25	136,452.70
50	23	107,094.28
51	29	151,823.80
52	28	129,777.76
53	27	125,965.70
54	34	174,407.02
55	27	149,251.28
56	27	123,935.66
57	36	174,685.76
58	21	110,068.84
59	24	120,986.82
60	31	$ 158,239.94
61	22	117,410.24
62	25	100,699.50
63	31	144,967.10
64	30	161,674.88
65	18	66,184.68
66	17	72,689.80
67	8	41,091.24
68	9	51,240.28
69	9	33,222.28
70	5	35,056.84
72	2	12,391.32
77	1	2,850.00
TOTALS	752	$3,628,635.00

TABLE 5

Number of Active Pay-back Members
and Annual Salaries at December 31, 1957

F E M A L E

Age	Number	Annual Salaries
28	2	$ 6,398.12
31	1	3,120.00
32	1	3,240.00
33	2	4,111.88
34	1	3,344.00
35	1	4,174.00
36	6	26,417.12
37	6	22,847.16
38	2	8,412.00
39	3	7,890.40
40	10	42,305.10
41	10	28,151.38
42	11	40,388.58
43	6	24,892.00
44	14	55,662.88
45	11	44,819.34
46	11	37,681.24
47	9	32,208.50
48	12	40,114.68
49	14	56,913.92
50	24	91,355.06
51	19	58,724.36
52	17	35,254.10
53	26	90,383.04
54	17	49,866.30
55	12	42,045.44
56	20	72,449.74
57	15	50,429.74
58	16	54,192.32
59	14	44,500.12
60	15	$ 52,033.88
61	17	50,188.36
62	10	29,310.24
63	16	50,242.60
64	5	19,988.32
65	7	20,928.92
66	6	17,895.82
67	7	21,842.90
68	5	19,940.74
70	3	11,475.50
71	1	2,448.36
74	1	3,720.00
TOTALS	406	$1,382,308.16

TABLE 6

Number of Active Pay-back Members with Membership Service and Prior Service at December 31, 1957

M A L E

	Membership Service		Prior Service	
Age	Number	Total Service	Number	Total Service
27	5	25		
28	5	15		
29	2	6		
30	5	31		
31	7	46		
32	11	43		
33	9	48		
34	9	35		
35	9	43		
36	9	27		
37	13	92		
38	9	67		
39	12	100		
40	17	172		
41	5	47		
42	14	180		
43	10	119		
44	12	151		
45	15	310	1	
46	22	354	-	
47	17	225	1	1
48	26	477	2	2
49	25	455	5	10
50	23	382	1	1
51	29	596	2	2
52	28	508	9	21
53	27	488	6	22
54	34	617	9	32
55	27	509	8	24
56	27	531	6	22
57	36	666	11	35
58	21	401	5	26
59	24	466	9	29
60	31	574	11	64
61	22	423	5	26
62	25	502	6	27
63	31	584	9	37
64	30	530	9	65
65	18	362	5	18
66	17	294	5	27
67	8	152	3	27
68	9	186	3	17
69	9	123	1	9
70	5	111	1	9
72	2	48	1	13
77	1	7	-	-
TOTALS	752	12,128	134	566

TABLE 7

Number of Active Pay-back Members with Membership Service and Prior Service at December 31, 1957

FEMALE

Age	Membership Service Number	Membership Service Total Service	Prior Service Number	Prior Service Total Service
28	2	22		
31	1	15		
32	1	15		
33	2	17		
34	1	12		
35	1	15		
36	6	60		
37	6	69		
38	2	25		
39	3	42		
40	10	136		
41	10	137		
42	11	155		
43	6	95		
44	14	224		
45	11	124		
46	11	135		
47	9	127		
48	12	188		
49	14	221	1	4
50	24	341	3	7
51	19	281	1	4
52	17	291	3	9
53	26	376	-	-
54	17	202	3	11
55	12	193	4	15
56	20	280	3	6
57	15	187	3	10
58	16	218	2	5
59	14	186	2	3
60	15	290	4	16
61	17	238	3	13
62	10	102	1	8
63	16	254	-	-
64	5	94	1	4
65	7	71	-	-
66	6	78	1	8
67	7	108	-	-
68	5	81	1	9
70	3	39	1	5
71	1	4	-	-
74	1	18	-	-
TOTALS	406	5,766	37	137

TABLE 8

Inactive Members with Vested Rights at December 31, 1957

M A L E

Age	Number	Total Service	Accumulated Contributions
23	3	-	$ 891.12
24	4	4	1,747.44
25	3	2	1,467.84
26	2	7	722.22
27	3	4	1,397.93
29	2	7	1,011.31
30	3	6	1,919.25
31	2	8	1,966.60
32	4	13	2,572.96
33	3	19	2,892.25
34	2	8	1,988.92
35	1	2	278.12
36	3	14	3,957.44
37	3	9	1,188.30
38	2	28	2,105.89
39	1	-	600.89
40	3	23	4,340.84
41	5	51	6,500.44
42	6	45	6,412.57
43	7	62	7,750.17
44	6	68	7,867.57
45	6	68	7,513.22
46	12	119	10,534.19
47	10	124	15,475.46
48	13	158	17,698.82
49	16	139	15,274.19
50	17	269	27,030.14
51	16	213	20,348.81
52	16	232	20,147.27
53	19	272	28,862.32
54	11	158	13,434.13
55	16	237	$ 22,872.86
56	12	197	27,416.49
57	8	65	6,625.89
58	8	138	14,111.82
59	11	145	14,795.61
60	14	160	19,159.78
61	7	88	11,506.83
62	7	91	11,705.14
63	11	121	19,451.10
64	9	106	11,658.30
65	9	121	10,935.63
66	2	4	1,842.18
67	3	53	5,321.35
68	2	39	2,508.88
69	1	-	348.62
70	2	4	618.78
72	1	3	381.82
81	1	6	1,076.46
TOTALS	328	3,710	$418,236.16

TABLE 9

Inactive Members with Vested Rights at December 31, 1957

FEMALE

Age	Number	Total Service	Accumulated Contributions	Age	Number	Total Service	Accumulated Contributions
23	1	3	$ 459.89	55	6	72	$ 6,407.41
				56	9	134	9,820.96
25	2	7	897.36	57	8	63	8,506.69
28	1	8	780.26	58	8	125	9,573.46
29	1	5	571.81	59	5	52	3,910.04
30	5	17	2,473.30	60	10	118	10,640.95
31	1	2	371.37	61	6	53	4,584.98
32	3	23	2,970.31	62	6	77	8,056.53
33	1	9	1,216.94	63	5	46	5,634.02
34	1	3	545.70	64	3	29	2,210.04
35	2	10	915.24	65	4	56	4,643.95
36	1	7	508.71	67	1	9	560.93
37	4	40	5,101.44	69	1	5	559.87
38	3	13	2,039.44				
39	4	38	4,952.43	TOTALS	183	1,835	$174,243.44
40	8	46	7,247.77				
41	2	27	3,089.02				
42	2	26	3,052.22				
43	6	47	6,444.39				
44	5	42	3,745.70				
45	4	36	4,255.84				
46	5	53	5,122.63				
47	9	84	6,638.71				
48	5	54	5,508.00				
49	4	40	1,993.59				
50	5	56	2,905.93				
51	6	67	6,291.19				
52	5	65	4,061.29				
53	8	85	5,232.60				
54	7	83	9,740.53				

TABLE 10

Inactive Members With Less Than $265.00
Accumulated Contributions at December 31, 1957

MALE

Age	Number	Accumulated Contributions	Age	Number	Accumulated Contributions
17	3	$ 7.48	50	60	$ 1,637.91
18	46	366.32	51	54	1,706.09
19	167	2,070.58	52	57	1,259.17
20	237	3,987.76	53	48	1,128.79
21	397	6,799.25	54	39	952.28
22	425	10,502.46	55	56	1,212.34
23	357	7,917.53	56	35	1,411.35
24	266	5,464.46	57	128	2,752.04
25	225	4,065.75	58	41	1,195.42
26	190	3,850.36	59	45	1,505.18
27	167	3,119.42	60	37	1,131.03
28	151	3,099.06	61	43	936.62
29	140	3,054.54	62	43	1,347.22
30	113	2,455.71	63	44	2,085.50
31	100	2,430.55	64	39	900.47
32	82	2,177.68	65	39	1,306.73
33	101	1,834.53	66	34	1,198.23
34	85	2,363.30	67	32	678.92
35	75	1,251.51	68	26	445.06
36	68	1,089.82	69	28	333.75
37	71	1,827.90	70	26	628.32
38	74	2,123.28	71	26	488.90
39	75	2,174.57	72	25	325.19
40	73	1,571.91	73	23	513.57
41	59	1,565.27	74	15	395.75
42	68	1,296.37	75	10	278.83
43	53	1,065.43	76	3	3.24
44	67	1,521.17	77	8	103.22
45	72	2,190.54	78	1	13.43
46	59	1,677.61	80	3	56.96
47	57	1,460.93	81	3	297.31
48	62	1,588.70	82	1	216.02
49	59	1,653.73	83	2	80.18
			TOTALS	5,318	$118,150.50

TABLE 11

Inactive Members With Less Than $265.00
Accumulated Contributions at December 31,1957

F E M A L E

Age	Number	Accumulated Contributions	Age	Number	Accumulated Contributions
17	1	$ 16.11	50	14	$ 563.24
18	1	10.62	51	17	610.27
19	5	90.98	52	20	1,480.92
			53	20	781.39
20	28	384.76	54	11	698.82
21	40	743.45			
22	50	956.58	55	22	1,346.24
23	92	2,359.06	56	17	620.90
24	63	1,858.36	57	41	1,612.63
			58	10	400.53
25	61	1,414.67	59	11	312.35
26	60	1,901.79			
27	54	2,007.75	60	13	577.11
28	57	1,673.75	61	10	862.22
29	43	1,619.26	62	14	552.54
			63	18	956.59
30	48	2,504.41	64	6	101.68
31	53	2,124.24			
32	53	2,276.66	65	11	533.25
33	58	1,924.97	66	4	160.09
34	40	1,883.10	67	3	35.89
			68	1	4.22
35	34	1,478.01	69	3	130.65
36	41	996.01			
37	36	1,577.60	70	2	66.43
38	28	870.26	71	2	64.28
39	32	1,448.17	72	4	142.01
			73	3	179.56
40	21	1,079.23	74	2	117.20
41	23	1,000.07			
42	30	1,437.82	76	1	43.94
43	35	1,597.57	77	1	160.04
44	20	771.42			
			TOTALS	1,490	$54,879.49
45	19	373.75			
46	19	870.87			
47	17	403.90			
48	18	977.16			
49	29	1,132.14			

TABLE 12

Deduced Salary Scale Based Upon Average Annual Salaries

MALE

Age	Average Annual Salary	Effective Annual Salary
20	$1,714	$4,727
21	1,753	4,727
22	1,805	4,727
23	1,909	4,859
24	2,234	4,727
25	2,480	4,200
26	2,896	4,630
27	3,273	4,727
28	3,337	4,727
29	3,363	4,727
30	3,532	4,410
31	3,740	4,727
32	3,844	4,524
33	3,883	5,018
34	3,740	4,931
35	3,753	4,727
36	3,883	4,334
37	3,831	4,633
38	3,935	4,359
39	3,909	4,373
40	3,571	4,573
41	3,805	4,313
42	3,558	4,165
43	3,701	4,231
44	3,792	4,981
45	3,844	4,548
46	3,987	4,116
47	3,909	4,566
48	4,156	4,457
49	3,792	4,727
50	$3,792	$4,156
51	3,714	4,188
52	3,883	4,297
53	3,961	4,214
54	3,701	4,144
55	3,961	3,974
56	3,948	4,594
57	4,104	3,929
58	3,818	4,328
59	3,987	4,179
60	3,909	4,433
61	3,740	4,225
62	3,831	4,079
63	3,974	4,067
64	3,571	4,194
65	3,701	3,977

TABLE 13

Deduced Salary Scale Based Upon Average Annual Salaries

F E M A L E

Age	Average Annual Salary	Effective Annual Salary	Age	Average Annual Salary	Effective Annual Salary
20	$1,930	$3,425	50	$2,730	$3,332
21	1,955	3,463	51	2,693	3,215
22	2,250	3,425	52	2,902	3,279
23	2,250	3,425	53	2,828	3,249
24	2,533	3,413	54	2,754	3,234
25	2,496	3,383	55	2,889	3,207
26	2,533	3,673	56	2,717	3,425
27	2,582	3,425	57	2,939	3,037
28	2,582	3,357	58	2,803	3,425
29	2,766	3,481	59	2,963	3,314
30	2,607	3,443	60	2,816	3,556
31	5,041	3,551	61	2,939	3,314
32	2,484	3,425	62	2,779	3,505
33	2,422	3,284	63	2,877	3,227
34	2,631	3,097	64	2,988	3,350
35	2,668	3,425	65	2,902	3,348
36	2,693	3,434			
37	2,582	3,302			
38	2,484	3,232			
39	2,717	3,342			
40	2,594	3,291			
41	2,717	3,194			
42	2,730	3,463			
43	2,631	3,373			
44	2,975	3,229			
45	2,693	3,636			
46	2,631	3,423			
47	2,594	3,220			
48	2,902	3,301			
49	2,852	3,425			

TABLE 14

Superannuation Retirements Classified by Age

Age	MALE Number	MALE Annual Payments	FEMALE Number	FEMALE Annual Payments
65	1	$ 1,200.00	--	$ --
69	1	1,200.00	--	--
70	1	1,200.00	--	--
71	2	2,346.72	--	--
72	3	3,199.92	--	--
73	3	2,690.64	2	1,847.28
74	3	2,347.80	4	3,444.84
75	8	6,767.64	--	--
76	8	7,309.92	5	3,267.36
77	9	7,708.44	7	4,466.04
78	15	12,546.36	2	2,167.68
79	11	10,872.12	5	4,191.60
80	14	11,691.36	7	4,667.28
81	13	12,347.28	6	3,280.56
82	6	5,914.20	6	5,224.20
83	7	6,788.40	5	2,001.84
84	10	8,801.76	1	600.00
85	3	3,352.44	2	1,845.36
86	10	7,376.28	1	717.84
87	--	--	4	2,312.52
88	4	3,168.00	--	--
89	7	5,509.68	--	--
90	3	2,869.92	--	--
91	4	3,679.80	1	329.04
92	1	900.00	--	--
93	3	1,589.88	--	--
95	1	881.52	--	--
98	--	--	1	837.00
TOTALS	151	$134,260.08	59	$41,200.44

TABLE 15

Proportional Annuity Retirements
Classified by Age

Age	MALE Number	MALE Annual Payments	FEMALE Number	FEMALE Annual Payments
46	1	$ 348.12	--	$ --
47	--	--	1	241.44
49	2	526.80	--	--
51	1	337.68	--	--
53	1	221.88	1	342.36
54	--	--	1	342.24
55	1	969.96	1	283.56
56	1	635.64	3	1,189.56
58	3	2,278.92	--	--
59	1	542.28	--	--
60	1	385.32	1	425.88
61	1	397.44	--	--
63	2	1,245.60	1	167.64
64	2	1,323.72	--	--
65	5	2,768.52	1	250.32
66	8	5,122.08	2	673.68
67	5	3,069.96	3	2,029.56
68	2	920.40	2	1,166.64
69	1	713.40	1	816.84
70	2	2,195.88	3	2,652.12
71	3	2,477.76	1	914.64
72	1	970.68	4	2,259.48
73	2	2,048.16	--	--
74	1	872.40	3	1,067.88
75	1	632.76	1	383.04
76	2	1,119.72	1	358.20
77	5	3,024.96	2	1,688.04
78	3	1,529.04	--	--
79	1	807.84	3	1,806.48
80	2	1,700.64	3	1,562.28
81	3	1,729.44	2	1,234.80
82	4	2,545.68	--	--
85	1	452.40	--	--
86	2	1,035.00	--	--
87	--	--	2	744.72
90	1	706.20	--	--
91	--	--	1	612.48
TOTALS	72	$45,656.28	44	$23,213.88

TABLE 16

Partial Annuity Retirements
Classified by Age

	MALE		FEMALE	
Age	Number	Annual Payments	Number	Annual Payments
47	--	$ --	1	$ 132.72
55	1	189.60	--	--
56	1	209.88	--	--
59	1	266.04	--	--
67	1	461.40	1	347.28
68	1	200.28	--	--
70	--	--	1	319.08
72	2	627.72	--	--
73	2	332.16	2	436.56
74	2	831.12	--	--
75	1	186.12	1	78.48
76	5	1,502.88	--	--
77	--	--	2	372.84
78	3	846.36	4	863.88
79	2	492.36	4	968.52
80	1	261.72	1	97.56
81	3	1,140.72	1	295.32
82	5	1,240.92	--	--
83	4	978.84	--	--
84	2	541.92	--	--
85	1	103.20	--	--
87	1	196.68	--	--
TOTALS	39	$10,609.92	18	$3,912.24

TABLE 17

Retirement Allowances Classified by Age

	MALE		FEMALE	
Age	Number	Annual Payments	Number	Annual Payments
58	8	$ 11,665.80	3	$ 4,211.28
59	14	27,249.60	5	7,436.04
60	16	28,782.24	4	7,608.00
61	26	44,280.36	10	17,177.16
62	17	24,548.88	14	20,553.00
63	18	30,805.56	9	13,884.00
64	34	60,502.32	14	24,447.24
65	40	56,944.92	25	36,225.48
66	58	93,549.72	27	25,333.20
67	53	77,350.56	25	29,206.56
68	59	88,548.24	32	33,046.89
69	71	90,993.57	32	35,532.84
70	84	105,003.96	40	39,234.12
71	82	106,191.72	51	46,779.48
72	87	101,478.00	43	43,845.24
73	62	68,337.84	36	35,736.36
74	68	76,324.20	20	19,481.28
75	52	63,430.08	17	13,607.28
76	30	29,947.32	19	13,602.96
77	37	37,505.64	13	6,938.88
78	22	18,710.64	3	2,393.40
79	9	9,679.68	3	2,284.20
80	5	4,489.08	3	4,070.52
81	3	2,675.40	3	3,524.88
82	2	1,656.50	--	--
83	1	1,556.76	--	--
84	1	689.40	--	--
85	1	1,069.32	1	1,056.24
90	1	551.28	1	812.88
TOTALS	961	$1,264,518.59	453	$ 488,029.41

TABLE 18

Disability Annuities Classified by Age

	MALE		FEMALE	
Age	Number	Annual Payments	Number	Annual Payments
46	--	$ --	1	$ 996.00
52	1	1,500.00	--	--
54	1	1,280.04	--	--
56	1	1,280.04	--	--
58	3	2,297.76	--	--
59	1	826.92	1	1,362.36
60	2	1,955.16	3	2,662.92
61	3	3,036.48	--	--
62	6	6,070.80	--	--
63	4	3,701.28	1	848.88
64	--	--	1	556.68
65	2	2,125.56	1	553.08
66	1	1,066.68	2	1,571.76
67	2	1,560.24	--	--
69	1	802.44	--	--
75	1	526.08	--	--
85	1	900.00	--	--
98	--	--	1	172.44
TOTALS	30	$28,929.48	11	$8,724.12

TABLE 19

Reversionary Annuities in Force Classified by Age

FEMALE

Age	Number	Annual Payments
53	1	$ 1,144.20
56	1	1,162.44
57	1	1,495.08
59	1	1,243.68
61	2	1,007.40
62	2	2,839.20
63	1	1,018.32
66	2	1,020.00
69	1	794.52
73	1	913.80
74	1	1,494.48
76	1	572.64
TOTALS	15	$14,705.76

TABLE 20

Retirement Annuities in Force

	MALE		FEMALE	
Age	Number	Annual Payments	Number	Annual Payments
62	1	$2,883.00	--	$ --
63	1	2,919.24	1	3,705.12
64	3	8,953.68	1	2,765.16
65	1	4,219.44	1	3,518.40
66	1	4,104.00	1	5,064.00
67	1	3,257.40	1	2,926.92
68	2	5,829.36	1	3,672.00
69	1	4,512.00	1	3,961.32
70	5	19,205.64	--	--
72	--	--	1	2,709.60
80	1	4,703.04	--	--
TOTALS	17	$60,586.80	8	$28,322.52

TABLE 21

Prospective Reversionary Annuities
Showing Amounts of Reversionary Annuity
and Reduced Retirement Annuity

MALE

Age of Member	Age of Spouse		Annual Reversionary Annuity	Revised Reduced Retirement Annuity
58	62		$ 1,185.24	$ 1,185.24
60	59		660.00	1,350.36
60	58		824.28	824.28
61	57		600.00	903.12
61	62		720.00	2,161.56
63	61		600.00	2,179.68
64	57		600.00	1,983.12
65	54		180.00	2,012.52
65	55		332.28	332.28
65	62		240.00	1,556.28
66	62		300.00	1,239.96
67	58		600.00	2,042.52
67	64		900.00	1,993.20
68	69		600.00	2,170.80
68	50		617.04	617.04
69	54		540.00	1,344.00
69	65		600.00	2,065.68
69	69		600.00	2,157.12
70	41		300.00	934.80
70	62		300.00	976.80
70	64		669.00	669.00
70	74		1,032.60	2,065.08
71	64		300.00	2,201.16
71	73		913.80	913.80
72	66		1,362.24	1,362.24
72	67		600.00	2,038.68
72	71		900.00	1,961.16
72	71		180.00	432.26
73	70		240.00	533.28
73	73		600.00	1,110.36
74	67		694.20	694.20
74	69		600.00	2,037.24
74	69		600.00	1,101.96
75	60		600.00	1,286.04
75	75		454.68	454.68
76	70		336.48	336.48
77	72		600.00	1,645.92
		TOTALS	$21,981.84	$50,874.00

FEMALE

Age of Member	Age of Spouse	Annual Reversionary Annuity	Revised Reduced Retirement Annuity
62	76	$776.04	$776.04

TABLE 22

Optional Annuities in Force and Children's Annuities

MALE

Option 1 - 5 Years Certain and Life

Age	Number	Annual Payment
70	1	$459.96

Option 2 - 10 Years Certain and Life

Age	Number	Annual Payment
61	1	$2,030.04

Option 5 - Joint and Last Survivor
(Same amount to member and beneficiary)

Age	Number	Annual Payment
64	1	$2,015.16

Option 6 - Joint and Last Survivor 1/2 to beneficiary

Age	Number	Annual Payment
65	1	$4,085.40
70	1	1,510.20

Deferred Female Children

Age	Number	Years Deferred	Annual Payment
8	1	3	$540.00
11	1	1	540.00