

MARTIN E. SEGAL COMPANY  
INCORPORATED

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December 18, 1978

Retirement Board of the Employees'  
Retirement System  
State of Rhode Island  
198 Dyer Street  
Providence, Rhode Island 02903

Dear Members of the Board:

We are pleased to submit herewith our Actuarial Valuation of the Employee's Retirement System as of June 30, 1978.

Our report analyzes the actuarial status of the System, and projects the cost requirements for the Board to certify to the Legislature.

We received a great deal of help from State employees in obtaining the information which forms the basis of this report. Most important, Mr. Joseph G. Iannelli, Executive Director; Mr. John F. Sullivan, Assistant Director; and Mr. Carlo Mencucci, Principal Accountant, were available whenever needed to answer any questions and provide any information requested. Indeed, the material they provided on their own initiative anticipated many of our needs.

*Report  
of the  
Actuary*

For convenience, this report is divided into the following sections:

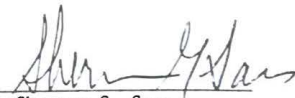
- I. SUMMARY
- II. EMPLOYEE DATA
- III. RETIREE DATA
- IV. RETIREMENT FUND
- V. ACTUARIAL ASSUMPTIONS AND METHODS
- VI. RESULTS OF VALUATION

Following the report, we have attached our actuarial certificate detailing the cost factors, assumptions, and plan of benefits used for the valuation.

We will be pleased to meet with you to discuss this report at your convenience.

Sincerely yours,

MARTIN E. SEGAL COMPANY

By   
 Sherman G. Sass  
 Senior Vice President

By   
 Sherman B. Lieberman, F.S.A.

SGS/kmj

I. SUMMARY

Benefit Provisions

The Employees' Retirement System of Rhode Island covers most State employees. Legislators and elected officials may become members on an optional basis. State college teachers may elect coverage under the T.I.A.A. program. State employees contribute 5 per cent of their annual earnings; Teachers contribute 6 per cent.

The System provides unreduced benefits of 1.7 per cent of earnings for the first ten years of service; 1.9 per cent for the next ten years; and 2.4 per cent per year of service over 20 years up to a maximum of 80 per cent of earnings for all years of service. Such benefits are available to members at least age 55 with 30 years of service or age 60 with 10 years of service, or after 35 years at any age. State correctional officers may retire at age 50 if they have 20 years of service, at 2 per cent for each year of service. Benefits are based on the average of the highest 3 consecutive years' earnings. After retirement, "cost-of-living increases" amounting to 3 per cent per year of the original award are provided, independent of actual changes in the Consumer Price Index.

The plan also provides non-service-connected disability and vested benefits after 7 and 10 years of service, respectively; service-connected disability pensions with no minimum service requirement; widow's benefits for service-connected death; and certain lump sum death benefits.

More detail can be found in the actuarial certificate following this report.

Employee Data

We received data on 15,543 active State Employees and 10,850 Teachers as of June 30, 1978 who were participating in the system. The average salary was \$12,300 for State Employees and \$16,200 for Teachers.

On the average, the State Employees were age 43 and had 8½ years of service; Teachers were age 39 with 10½ years of service.

#### Retiree Data

We received data on 3,858 State Employee pensioners and 159 beneficiaries as of June 30, 1978. The pensioners' average monthly benefit was \$274. There were 2,620 retired Teachers and 64 beneficiaries; the average benefit was \$544 a month for the pensioners. Of all the pensioners on the rolls, 8 per cent had retired in the year ended June 30, 1978.

#### Retirement Fund

As of June 30, 1978, the Fund had assets of \$319 million available as an offset to the actuarial liabilities for future benefits.

#### Actuarial Valuation

Our valuation was prepared as of June 30, 1978. Our calculations were based on what we believe are reasonable assumptions as to expected future experience. The assumptions are the same as those used in our previous actuarial valuation. We used the "entry age normal cost" method of funding, which spreads the cost of each employee's pension as a level percentage of his earnings from date of hire to retirement.

The employer normal cost\* for State Employees is \$10½ million. This is 5.5 per cent of the payroll of participating State Employees. The employer normal cost for Teachers is \$8 million or 4.7 per cent of payroll.

For State Employees, the actuarial liability\* (for benefits earned before July 1, 1978) is \$429 million of which \$142 million represents the liability to those already receiving pensions. The unfunded actuarial liability at the end of the year is \$261 million. For Teachers, the actuarial liability is \$510 million of which \$184 million is for those receiving pensions. The unfunded actuarial liability stands at \$374 million.

The value of the System's vested benefits is \$761 million. Thus the assets are short of this amount by \$457 million (excluding assets allocable to the Teachers Survivors' program).

Based on the normal cost plus 30-year amortization of the unfunded actuarial liability, the annual employer cost as of June 30, 1978 is \$30 million (15.9 per cent of covered payroll) for State Employees and \$36 million (20.6 per cent of covered payroll) for Teachers. These amounts are in addition to the required employee contributions.

In fiscal 1979-80, the State's revised statutory funding schedule calls for the full normal cost and 70 per cent of the 30-year amortization payment of unfunded actuarial liability to be contributed. This amounts to 12.3 per cent of payroll for State Employees and 15.4 per cent of payroll for Teachers. (Half of this cost for Teachers is paid for by the municipalities.) According to the statute, the portion of the 30-year amortization payment required to be contributed will increase by 10 per cent each year until the full actuarial cost will be required for 1982-83 and later years.

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\*See note on page 2.

\*Please refer to the "Actuarial Assumptions and Methods" section of the report for definitions of these terms.

Table 1A  
Number and Average Salaries of Employees in Active Service as of June 30, 1978  
By Age and By Years of Service

STATE EMPLOYEES

Age	Total	Years of service								
		0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 and over	Unknown
Total	15,543 \$12,300	6,439 \$11,000	4,377 \$11,700	2,057 \$13,200	1,191 \$14,700	660 \$15,600	383 \$17,000	210 \$17,500	98 \$18,600	128 \$12,600
Under 20	167 \$ 8,600	165 \$ 8,600	-- --	-- --	-- --	-- --	-- --	-- --	-- --	2 \$ 6,600
20 - 24	1,515 9,400	1,364 9,400	145 \$ 9,500	-- --	-- --	-- --	-- --	-- --	-- --	6 9,400
25 - 29	2,049 11,300	1,389 11,400	601 11,300	55 \$10,900	-- --	-- --	-- --	-- --	-- --	4 11,600
30 - 34	1,702 13,200	834 12,600	666 13,900	179 13,400	20 \$12,300	-- --	-- --	-- --	-- --	3 10,400
35 - 39	1,220 13,300	522 12,200	375 12,800	219 15,600	92 15,800	11 \$13,500	-- --	-- --	-- --	1 9,800
40 - 44	1,279 12,900	478 11,500	379 11,900	198 14,300	139 16,800	64 15,900	19 \$15,200	-- --	-- --	2 15,000
45 - 49	1,637 12,700	534 11,100	501 11,400	236 13,800	166 16,100	115 15,900	62 15,500	14 \$13,800	-- --	9 12,600
50 - 54	2,099 12,700	545 10,800	643 11,100	383 12,900	216 15,300	145 17,200	95 17,900	57 17,700	8 \$15,400	7 17,500
55 - 59	2,023 12,600	429 10,700	548 11,000	395 12,400	272 13,300	171 15,000	103 17,800	69 17,500	27 18,500	9 22,800
60 - 64	1,424 12,700	169 10,500	420 10,800	306 12,200	219 13,200	124 14,300	78 17,100	57 18,100	43 18,400	8 25,200
65 and over	341 13,500	3 13,300	96 11,600	84 12,300	67 13,900	30 14,800	26 14,900	13 17,700	20 20,300	2 20,000
Unknown	87 9,800	7 8,800	3 8,200	2 13,000	-- --	-- --	-- --	-- --	-- --	75 9,900

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Table 1B  
Number and Average Salaries of Employees in Active Service as of June 30, 1978  
By Age and By Years of Service

TEACHERS

Age	Total	Years of service								
		0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 and over	Unknown
Total	10,850 \$16,200	2,071 \$12,700	4,390 \$15,900	1,964 \$17,600	1,147 \$18,400	683 \$19,100	356 \$19,800	95 \$19,000	79 \$19,200	65 \$14,400
Under 20	3 \$20,600	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	3 \$20,600
20 - 24	200 9,900	193 10,000	5 \$ 8,500	-- --	-- --	-- --	-- --	-- --	-- --	2 8,500
25 - 29	2,365 13,200	1,139 12,100	1,212 14,300	5 \$11,900	-- --	-- --	-- --	-- --	-- --	9 12,400
30 - 34	2,541 16,100	306 13,800	1,786 16,200	440 17,600	1 \$17,600	-- --	-- --	-- --	-- --	8 14,700
35 - 39	1,533 17,100	198 14,200	492 16,900	634 17,700	204 18,400	1 \$17,800	-- --	-- --	-- --	4 17,600
40 - 44	1,091 17,700	106 14,600	287 17,000	256 17,800	350 18,900	91 18,700	-- --	-- --	-- --	1 11,500
45 - 49	1,026 18,000	66 14,900	263 16,900	201 17,800	217 18,400	222 20,000	55 \$18,900	-- --	-- --	2 18,300
50 - 54	935 18,100	38 16,300	207 16,900	206 17,400	142 18,000	148 19,200	157 20,200	33 \$19,100	3 \$17,400	1 16,300
55 - 59	684 18,100	19 16,500	100 17,000	141 17,600	142 18,000	128 18,400	86 19,800	41 18,800	27 19,400	-- --
60 - 64	322 18,000	2 12,800	29 16,900	60 17,400	62 17,600	70 18,100	42 19,100	17 19,500	39 18,800	1 16,800
65 and over	105 18,100	-- --	6 17,100	18 16,600	29 17,700	23 17,600	15 19,800	4 17,900	10 21,100	-- --
Unknown	45 14,500	4 13,900	3 16,100	3 17,900	-- --	-- --	1 18,800	-- --	-- --	34 14,000

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## II. EMPLOYEE DATA

We received data on 15,543 State Employees and 10,850 Teachers participating in the System on June 30, 1978. The data included age, service, sex, and salary for each participant. The average salary of the participants was \$12,300 for State Employees and \$16,200 for Teachers. The data included 365 Correctional Officers and 112 Legislators. About 55 per cent of the Teachers -- are not covered by Social Security and therefore are eligible for Teachers Survivor benefits.

Tables 1A and 1B give detailed age, service and average salary data on State Employees and Teachers, respectively. In preparing these tables, we assumed an annual salary of \$10,000 for the State Employees for whom earnings were missing. A \$15,000 annual salary was imputed for Teachers with unknown compensation.

Tables 2A and 2B summarize certain basic statistics on active State Employees and Teachers and compare them to those of the previous year. During the year, average salary for State employees increased by 9.8 per cent while Teacher's average salary increased by 9.5 per cent. Aggregate payroll increased by 7.9 per cent and 6.8 per cent for State employees and Teachers, respectively.

Overall, the data was in excellent condition. There was no problem with missing sex information on State employees as was encountered in the previous valuation. We recommend that the Board continue to pursue its program of storing all basic information on participants on computer files.

Table 2A

Statistical Data on Active State Employees  
On June 30, 1978 and 1977

	June 30, 1978	June 30, 1977
Number of covered employees	15,543	15,700
Total annual salary	\$190,451,300	\$176,569,900
Average annual salary	\$ 12,300	\$ 11,200
Average age	43	41½
Average years of service	8½	7½
Number eligible for service retirement	1,242	991
Number vested but not eligible to retire	3,357	3,015

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III. RETIREE DATA

The data on retired members and beneficiaries included age, sex, monthly benefit, retirement date, option, and type of pension.

The following are significant statistics on the retired group:

	<u>State Employees</u>	<u>Teachers</u>
Pensioners:		
Number	3,858	2,620
Average age	70	72
Average monthly benefit	\$274	\$544
Beneficiaries:		
Number	159	64
Average age	77	75½
Average monthly benefit	\$204	\$366

Table 3A gives distributions of the 361 new State Employee pensions in the current year by type of pension and amount. Table 4A does the same for age at retirement. Tables 3B and 4B are similar for the 157 new Teacher pensions.

Tables 5A and 5B give distributions for all pensions in force at the end of the fiscal year by type and amount. Tables 6A and 6B do the same by age.

The data on retirees was reasonably good for retired employees. However, it was inadequate to be certain that beneficiaries were classified correctly.

The data on terminated employees with vested rights was not adequate to calculate a cost for them.

We recommend that this information be maintained by this system so that it can be incorporated in the next review.

Table 2B

Statistical Data on Active Teachers  
On June 30, 1978 and 1977

	June 30, 1978	June 30, 1977
Number of covered employees	10,850	11,143
Total annual salary	\$176,022,900	\$164,883,600
Average annual salary	\$ 16,200	\$ 14,800
Average age	39	38
Average years of service	10½	9½
Number eligible for service retirement	460	418
Number vested but not eligible to retire	3,864	3,410

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Table 3A

Pensions Awarded in the Year Ended June 30, 1978  
By Type and by Monthly Amount

## STATE EMPLOYEES

Monthly Amount	Total	Type of pension			
		Service	Ordinary Disability	Accidental Disability	Legislator
Total	361	320	29	8	4
Under \$50	3	2	--	1	--
\$ 50 - \$ 99	22	19	2	1	--
100 - 149	52	51	--	1	--
150 - 199	55	42	12	1	--
200 - 249	43	34	7	--	2
250 - 299	37	31	4	1	1
300 - 349	21	19	1	--	1
350 - 399	11	10	--	1	--
400 - 449	16	15	1	--	--
450 - 499	10	10	--	--	--
500 - 599	22	20	--	2	--
600 - 699	15	13	2	--	--
700 - 799	8	8	--	--	--
800 - 899	9	9	--	--	--
900 - 999	5	5	--	--	--
1,000 - 1,099	8	8	--	--	--
1,100 - 1,199	6	6	--	--	--
1,200 - 1,299	4	4	--	--	--
1,300 - 1,399	7	7	--	--	--
1,400 - 1,499	1	1	--	--	--
1,500 - 1,999	5	5	--	--	--
2,000 - 2,499	1	1	--	--	--

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Table 3B

Pensions Awarded in the Year Ended June 30, 1978  
By Type and by Monthly Amount

## TEACHERS

Monthly Amount	Total	Type of pension		
		Service	Ordinary Disability	Accidental Disability
Total	157	146	10	1
\$ 50 - \$ 99	1	1	--	--
150 - 199	2	2	--	--
200 - 249	3	3	--	--
250 - 299	6	6	--	--
300 - 349	7	5	2	--
350 - 399	5	5	--	--
400 - 449	8	8	--	--
450 - 499	11	8	3	--
500 - 599	17	16	1	--
600 - 699	16	13	3	--
700 - 799	19	19	--	--
800 - 899	17	16	1	--
900 - 999	11	11	--	--
1,000 - 1,099	18	17	--	1
1,100 - 1,199	5	5	--	--
1,200 - 1,299	5	5	--	--
1,300 - 1,399	3	3	--	--
1,400 - 1,499	2	2	--	--
1,500 - 1,999	1	1	--	--

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Table 4A  
Pensions Awarded in the Year Ended June 30, 1978  
By Type and by Age on Effective Date  
STATE EMPLOYEES

Age on Effective Date	Total	Type of pension			
		Service	Ordinary Disability	Accidental Disability	Legislator
Total	361	320	29	8	4
25 - 29	1	--	1	--	--
30 - 34	2	--	1	1	--
35 - 39	1	--	1	--	--
45 - 49	6	2	3	1	--
50	2	--	--	2	--
51	2	--	2	--	--
52	12 { 4	2	2	--	--
53	2	2	--	--	--
54	2	1	1	--	--
55	12 { 12	6	2	1	3
56	4	3	1	--	--
57	27 { 1	1	--	--	--
58	3	2	1	--	--
59	7	3	4	--	--
60	43	43	--	--	--
61	173 { 24	22	2	--	--
62	57	52	5	--	--
63	33	30	1	2	--
64	16	15	--	1	--
65	52	50	1	--	1
66	21	21	--	--	--
67	121 { 19	18	1	--	--
68	12	12	--	--	--
69	17	17	--	--	--
70 and over	18	18	--	--	--

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Table 4B  
Pensions Awarded in the Year Ended June 30, 1978  
By Type and by Age on Effective Date

TEACHERS

Age on Effective Date	Total	Type of pension		
		Service	Ordinary Disability	Accidental Disability
Total	157	146	10	1
40 - 44	2	--	2	--
45 - 49	1	--	--	1
50	4 { 1	--	1	--
54	3	--	3	--
55	7	6	1	--
56	21 { 3	1	2	--
57	2	2	--	--
58	4	4	--	--
59	5	4	1	--
60	34	34	--	--
61	87 { 13	13	--	--
62	17	17	--	--
63	9	9	--	--
64	14	14	--	--
65	12	12	--	--
66	39 { 7	7	--	--
67	6	6	--	--
68	6	6	--	--
69	8	8	--	--
70	3	3	--	--

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Table 5A  
Pensions in Force on June 30, 1978  
By Type and by Monthly Amount  
STATE EMPLOYEES

Monthly Amount	Total	Type of pension				
		Service	Ordinary Disability	Accidental Disability	Legislator	Beneficiary
Total	4,017	3,376	291	68	123	159
Under \$50	139	118	6	7	--	8
\$ 50 - \$ 99	730	662	30	6	--	32
100 - 149	764	644	84	9	--	27
150 - 199	537	432	72	6	--	27
200 - 249	393	304	36	4	22	27
250 - 299	278	221	22	5	23	7
300 - 349	212	164	12	6	17	13
350 - 399	156	129	12	8	4	3
400 - 449	146	118	5	2	18	3
450 - 499	99	83	--	3	8	5
500 - 599	183	135	8	8	31	1
600 - 699	93	86	4	--	--	3
700 - 799	77	72	--	3	--	2
800 - 899	60	59	--	1	--	--
900 - 999	41	40	--	--	--	1
1,000 - 1,099	33	33	--	--	--	--
1,100 - 1,199	23	23	--	--	--	--
1,200 - 1,299	21	21	--	--	--	--
1,300 - 1,399	12	12	--	--	--	--
1,400 - 1,499	5	5	--	--	--	--
1,500 - 1,999	13	13	--	--	--	--
2,000 - 2,499	2	2	--	--	--	--

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Table 5B  
Pensions in Force on June 30, 1978  
By Type and by Monthly Amount  
TEACHERS

Monthly Amount	Total	Type of pension			
		Service	Ordinary Disability	Accidental Disability	Beneficiary
Total	2,684	2,538	74	8	64
Under \$50	3	3	--	--	--
\$ 50 - \$ 99	17	16	--	--	1
100 - 149	55	49	2	--	4
150 - 199	124	105	12	--	7
200 - 249	113	91	10	1	11
250 - 299	122	106	9	--	7
300 - 349	151	133	12	--	6
350 - 399	210	199	5	--	6
400 - 449	462	450	7	--	5
450 - 499	162	155	5	--	2
500 - 599	275	264	6	1	4
600 - 699	289	279	4	--	6
700 - 799	275	269	1	1	4
800 - 899	165	161	1	2	1
900 - 999	124	122	--	2	--
1,000 - 1,099	69	68	--	1	--
1,100 - 1,199	28	28	--	--	--
1,200 - 1,299	19	19	--	--	--
1,300 - 1,399	10	10	--	--	--
1,400 - 1,499	4	4	--	--	--
1,500 - 1,999	6	6	--	--	--
2,000 - 2,499	1	1	--	--	--

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Table 6A

Pensions in Force on June 30, 1978  
By Type and By Age  
STATE EMPLOYEES

Age on June 30, 1978	Total	Type of pension				
		Service	Ordinary Disability	Accidental Disability	Legislator	Beneficiary
Total	4,017	3,376	291	68	123	159
25 - 29	4	--	2	--	--	2
30 - 34	4	--	3	1	--	--
35 - 39	3	--	3	--	--	--
40 - 44	6	--	2	2	1	1
45 - 49	28	2	20	6	--	--
50 - 54	52	7	28	11	3	3
55 - 59	156	48	67	15	19	7
60 - 64	634	523	77	10	21	3
65 - 69	1,146	1,038	54	18	25	11
70 - 74	988	919	24	4	19	22
75 - 79	577	511	9	1	15	41
80 - 84	277	223	--	--	15	39
85 - 89	105	78	--	--	4	23
90 - 94	26	19	1	--	1	5
95 - 99	8	6	1	--	--	1
100 - 104	1	--	--	--	--	1
105 and over	2	2	--	--	--	--

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Table 6B

Pensions in Force on June 30, 1978  
By Type and By Age

## TEACHERS

Age on June 30, 1978	Total	Type of pension			
		Service	Ordinary Disability	Accidental Disability	Beneficiary
Total	2,684	2,538	74	8	64
20 - 24	1	1	--	--	--
40 - 44	3	--	3	--	--
45 - 49	5	1	4	--	--
50 - 54	12	--	7	1	4
55 - 59	72	54	13	3	2
60 - 64	353	331	16	4	2
65 - 69	673	655	13	--	5
70 - 74	738	715	8	--	15
75 - 79	405	386	4	--	15
80 - 84	268	251	5	--	12
85 - 89	114	107	1	--	6
90 - 94	33	31	--	--	2
95 - 99	5	4	--	--	1
100 - 104	2	2	--	--	--

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IV. RETIREMENT FUND

The State maintains the Employees' Retirement Fund. The Retirement Board provided us with financial statements as of June 30, 1978.

The Fund receives all member and employer contributions. The assets are invested by the State Investment Commission, with the income being added to the Fund and available for reinvestment.

Payments out of the Fund are primarily for refunds of employee contributions, lump sum death benefits, and pension payments. Contribution refunds occur when an employee terminates employment and elects to take a refund, or when he dies after retirement without having received payments from the Fund equal to his total contributions.

Table 7 gives a summary of income and expenditures for the years ended June 30, 1978 and 1977.

At June 30, 1978 assets totalled over \$319 million. Table 8 gives a breakdown of the assets and compares them to those of the previous year. About 75 per cent of the fund was invested in fixed income securities such as bonds and notes.

The financial statements indicate that 53 per cent of the assets relate to State Employees, 42 per cent are for Teachers, and 5 per cent relate to Teachers Survivors' benefits. There is also a small unallocated reserve for unclaimed benefits. Table 9 shows the allocation of assets in detail for 1978 and 1977.

Table 7

Summary Statement of Income and Expenses  
For the Years Ended June 30, 1978 and 1977

	<u>1978</u>	<u>1977</u>
Employer contributions	\$36,852,360	\$29,375,698
Member contributions	<u>19,982,000</u>	<u>19,006,191</u>
Total contributions	\$56,834,360	\$48,381,890
Less: Administration expenses	<u>470</u>	<u>162</u>
Net contribution income	\$56,833,890	\$48,381,727
Net miscellaneous items	115,495	151,807
Investment income:		
Dividends	\$ 4,172,358	\$ 4,017,610
Interest	15,755,443	13,220,010
Capital gains and losses	<u>33,528</u>	<u>188,843</u>
Net investment income	<u>19,961,329</u>	<u>17,426,464</u>
Total income available for benefit payments	\$76,910,714	\$65,959,998
Benefit payments:		
Pension benefits	\$33,387,955	\$30,179,882
Death benefits	1,099,609	1,009,086
Contribution refunds	<u>2,901,243</u>	<u>2,512,788</u>
Total benefit payments	<u>37,388,807</u>	<u>33,701,755</u>
Excess of income over expenses	<u>\$39,521,907</u>	<u>\$32,258,243</u>

Note: Detail figures may not add to totals due to rounding.

Table 8  
Assets as of June 30, 1978 and 1977

	<u>1978</u>	<u>1977</u>
Cash	\$ 2,076,229	\$ 1,193,205
Accrued interest receivable	3,984,800	3,632,935
Investments		
Government bonds	\$ 65,669,661	\$ 59,172,081
Corporate bonds	125,213,267	121,932,600
Common and preferred stocks	73,558,000	62,077,811
Certificates of deposit	11,337,778	5,100,000
Short-term notes	39,122,263	19,555,263
Repurchase agreements	--	8,000,000
(Less) Unamortized premiums and discounts	<u>(1,537,474)</u>	<u>(761,278)</u>
Total assets	<u>\$319,424,522</u>	<u>\$279,902,616</u>

Note: Detail figures may not add to totals due to rounding.

RHODE ISLAND ERS

Table 9  
Allocation of Assets by Plan  
as of June 30, 1978 and 1977

	<u>1978</u>	<u>1977</u>
State Employees:		
Employer reserves	\$114,973,981	\$100,890,805
Member reserves	<u>53,550,703</u>	<u>48,695,456</u>
Total State Employees reserves	\$168,524,685	\$149,586,261
Teachers:		
Employer reserves	\$ 60,994,394	\$ 49,403,817
Member reserves	<u>74,255,436</u>	<u>66,899,231</u>
Total Teacher reserves	135,249,831	116,303,048
Teachers Survivors:		
Employer reserves	\$ 10,972,310	\$ 9,722,545
Member reserves	<u>4,638,361</u>	<u>4,219,680</u>
Total Teachers Survivors reserves	15,610,671	13,942,225
Unallocated:		
Unclaimed benefit reserve	<u>39,336</u>	<u>71,081</u>
Total assets	<u>\$319,424,522</u>	<u>\$279,902,616</u>

Note: Detail figures may not add to totals due to rounding.

RHODE ISLAND ERS

## V. ACTUARIAL ASSUMPTIONS AND METHODS

The actual cost of a pension plan consists of the benefit payments and administrative expenses less any investment earnings. An actuarial cost method aims to budget this cost so as to establish a reasonable relationship between employer pension contributions and the employee services that give rise to the pension obligation. The result is an employer contribution which anticipates future payments. A fund accumulates which earns investment income, thus reducing the ultimate cost.

Calculating the appropriate contribution requires that projections, and therefore assumptions, be made as to future experience. Some items, such as mortality rates, can be predicted fairly accurately. Others, such as future salary increases, are, of course, subject to considerable variation. It will be useful to identify the assumptions used, particularly since broad questions of fiscal policy are implicit in certain of the assumptions. These assumptions are the same as those used in the June 30, 1977 study.

### Mortality Rates

We assumed that mortality rates would conform with the 1971 Group Annuity Mortality Table. This is a recently published table of pension plan mortality, and we believe it will be a reasonable basis for experience under the System. It is one of the tables in general use in valuing pension plans in the United States. Table 10 gives some life expectancies after retirement.

### Salary Projections

The System provides benefits that are based on the three highest consecutive years' salary for each employee. To assume that each employee's salary will be the same in the three years before retirement as it is today would seriously understate the System's cost. Accordingly, we use

a salary projection to anticipate future increases in earnings. Additionally, it is appropriate to compute pension normal costs which are level as a percentage of payroll rather than level as a dollar amount, and a salary projection is also used for this purpose. If the cost were calculated as a level dollar amount for an individual, the cost might be a high per cent of his pay when he was young and a lower per cent of his higher salary at a later age. By use of a salary projection, the contribution for an individual, all other things remaining the same, tends to stay at the same percentage over the years.

How to project future salaries is a major policy question. To what extent should one seek to anticipate, through present contributions, the full impact on pension costs of future salary changes?

For purposes of our cost determination, we have made a moderate allowance for general salary increases in the future. We also reflect salary increases as the result of longevity and promotions. The scale has relatively greater increases at the younger ages to correspond with the State's salary schedules. The salary scale factors are:

<u>Age</u>	<u>Present Salary as a % of Age 65 Salary</u>	<u>Annual Increases (Rate %)</u>
20	17.45	4.84
25	22.07	4.75
30	27.76	4.59
35	34.62	4.39
40	42.68	4.08
45	51.76	3.72
50	61.77	3.45
55	72.98	3.33
60	86.08	3.16

As will appear, the problem of salary projection has a parallel in the question of choosing an assumption as to future investment yield and the two are somewhat interrelated.

### Termination Rates

In any employee group, many employees will terminate and receive less than full benefits. Employees terminating with less than ten years of active service, for example, receive only a refund of their contributions. The termination assumption anticipates the release of State and Town funds that may have been accumulated for such people, thus resulting in a reduced ongoing cost.

We assumed that terminations each year from all causes except retirement would be as follows:

<u>Age</u>	<u>Death*</u>	<u>State Employees (Rate %)</u>			<u>Total*</u>
		<u>Disability</u>	<u>Withdrawal</u>		
20	.05	.06	21.20	21.31	
25	.06	.09	15.80	15.95	
30	.08	.11	11.60	11.79	
35	.11	.15	8.40	8.66	
40	.16	.22	6.20	6.58	
45	.29	.36	4.20	4.85	
50	.53	.61	--	1.13	
55	.85	1.01	--	1.86	
60	1.31	--	--	1.31	

15% of the above disability rates are service-connected.

### Teachers (Rate %)

<u>Age</u>	<u>Death*</u>	<u>Disability</u>	<u>Withdrawal</u>	<u>Total*</u>
20	.05	.06	12.30	12.50
25	.06	.09	9.70	9.85
30	.08	.11	7.50	7.69
35	.11	.15	5.66	5.92
40	.16	.22	4.14	4.52
45	.29	.36	2.75	3.41
50	.53	.61	--	1.13
55	.85	1.01	--	1.86
60	1.31	--	--	1.31

15% of the above disability rates are service-connected.

\*Rates shown are for men; rates for women are slightly lower

Note: Detail figures may not add to totals shown due to rounding.

### Retirement Ages

The System provides unreduced benefits as early as age 55 for general employees and 50 for State Correctional Officers. We have assumed State Employees will retire at age 64, or completion of 10 years of service if later. Teacher retirements are assumed to occur when the teacher is both age 63 and has 10 or more years of service. In any case where the employee already meets these assumed conditions of age and service, it is projected that he or she will retire immediately.

### Post-Retirement Increases

Cost-of-living increases are regularly provided to pensioners. Our calculation assumed 3 per cent annual benefit increases as provided by Statute. It should be noted that cost-of-living increases are based on the original pension award; they are not "compounded" from year to year.

### Investment Return

Investment return has a major effect on the ultimate cost of a retirement system. In general, if a system is actuarially funded (so that it has a substantial reserve which is earning an investment yield), a yield of 6 per cent - in contrast to a 5 per cent yield - will reduce costs by 16-20 per cent.

An assumption must be made concerning future yields. It must be a rate that will be valid for the long-run, that is, not only for money invested today or next year, but also for money invested 10 and 20 years from now.

We selected an investment return assumption of 6 1/2 per cent per year for our calculation. This assumption takes account of probable moderate long-term inflation but is not tied directly to the higher rates currently available.

#### Funding Method

We have used the "entry age normal cost" method of funding. This method spreads the cost of the benefits to be provided to an individual as a level percentage of his pay from his date of employment to his assumed date of retirement. The normal cost for the entire system is equal to the sum of the normal costs for all participants. In a rough sense, it can be visualized as the cost of benefits earned during the current year.

The actuarial liability represents the amount by which the future normal costs fall short of meeting the cost of future benefit payments. It can also be viewed, roughly, as the value of benefits accrued for service prior to the valuation date.

#### Overall Actuarial Basis

We believe that our assumptions, taken as a whole, are reasonable. To the extent that actual experience is better or worse than assumed, gains or losses will develop, with appropriate decreases or increases in future costs.

#### Missing Data

It was also necessary to make certain "non-actuarial" assumptions where data was missing or incomplete. In all cases, we assumed such individuals had the same characteristics as other participants, taking into account the known characteristics (e.g. male members age 37 with unknown service were assumed to have the same service distribution as male members age 37 with known service).

Table 10  
Expected Number of Years of Life  
Remaining at Specified Ages

Age	Male	Female
55	22.7	28.0
56	21.9	27.1
57	21.1	26.2
58	20.3	25.3
59	19.5	24.4
60	18.8	23.5
61	18.0	22.6
62	17.3	21.8
63	16.5	20.9
64	15.8	20.1
65	15.1	19.2
66	14.4	18.4
67	13.8	17.6
68	13.1	16.8
69	12.5	16.0
70	11.9	15.3
71	11.3	14.5
72	10.8	13.8
73	10.3	13.1
74	9.7	12.4
75	9.2	11.7

1971 Group Annuity Mortality Table.

VI. RESULTS OF VALUATION

State Employees

The costs for State Employees as of June 30, 1978, developed as follows:

<u>Item</u>	<u>Amount</u>	<u>% of Payroll</u>
(1) Participating payroll	\$190,451,300	--
(2) Employer normal cost	10,487,200	5.5%
(3) Unfunded actuarial liability	260,856,700	--
(4) Amortization of unfunded actuarial liability over 30 years from July 1, 1978	18,757,200	9.8
(5) Total annual cost if paid July 1, 1978 -- (2) + (4)	29,244,400	15.4
(6) Total annual cost if paid monthly = (5) plus ½ year interest	30,194,800	15.9

The calculations as completed assume that the employer contribution will be paid into the retirement fund at the beginning of each year, and will start to earn interest from that date. In fact, the money is deposited monthly. Thus about half a year's interest is lost, and the contribution must be increased to reflect this. Line 6, above, includes this adjustment.

The funding statute calls for the State to contribute the full normal cost plus 70 per cent of the 30-year amortization of the unfunded actuarial liability for the 1979-80 fiscal year, and also calls for an increase in the employee contribution rate of 0.5 per cent of pay as of July 1, 1979. Based on this requirement, the 1979-80 employer contribution for State Employees should be 12.3 per cent of payroll.

The "full cost" of the System's benefits (line 6) is 15.9 per cent of payroll which compares to 15.1 per cent for the previous year. Taking into account the scheduled increase in the employee contribution rate, this figure would be 15.4 per cent for 1979-80. The increase in

cost is due primarily to actuarial losses from salary increases in excess of the assumed rates and the fact that last year's statutory contribution represented only a portion of the "full cost" for that year.

Teachers

The costs for Teachers as of June 30, 1978, developed as follows:

<u>Item</u>	<u>Amount</u>	<u>% of Payroll</u>
(1) Participating payroll	\$176,022,900	--
(2) Employer normal cost	8,202,100	4.7%
(3) Unfunded actuarial liability	374,329,200	--
(4) Amortization of unfunded actuarial liability over 30 years from July 1, 1978	26,916,600	15.3
(5) Total annual cost if paid July 1, 1978 -- (2) + (4)	35,118,700	20.0
(6) Total annual cost if paid January, 1979 = (5) plus ½ year interest	36,260,100	20.6

The calculations as completed assume that the employer contribution will be paid into the retirement fund at the beginning of each year, and will start to earn interest from that date. In fact, the money is deposited in January. Thus about half a year's interest is lost, and the contribution must be increased to reflect this. Line 6, above, includes this adjustment.

Applying the funding statute to the Teachers' costs and adjusting for the change in employee contribution rate (0.5 per cent of pay increase as of July 1, 1979), gives a contribution requirement for fiscal 1979-80 of 15.4 per cent. Half of this (7.7%) is payable by the State and half by the municipalities.

The "full cost" is 20.6 per cent of payroll which compares to 20.1 per cent for the previous year. Taking into account the scheduled increase in the employee contribution rate, this figure would be 20.1



per cent for 1979-80. Reasons for the increase in cost are similar to those given for State employees.

#### Teachers Survivors

Because we do not have data on dependents of teachers, it is difficult to do a detailed analysis of the Teacher Survivor program. However, we have attempted to estimate the actuarial position based on "high cost" assumptions. For example, we assumed 25 per cent of teachers would be unmarried at death in active service, 10 per cent would be married but childless, and 65 per cent would be married with children (two children, one born when the wife was age 23 and the other at age 32). On this rough basis, the assets appear to be sufficient to fully cover the actuarial liabilities. The normal cost is estimated to be between \$110 and \$125 per person -- well within the \$192 combined annual employer - employee contribution (each pays 1 per cent of the first \$9,600 of salary).

Based on this analysis, we believe the present contribution is adequate to support the plan of benefits.

#### Value of Vested Benefits

In private pension plans, it is customary for the actuary to provide the "value of vested benefits". This figure is used by accountants in preparing financial statements, both as a disclosure item and as a factor in determining the pension expense charge, in accordance with Opinion No. 8 of the Accounting Principles Board of the American Institute of Certified Public Accountants, "Accounting for the Cost of Pension Plans". While we recognize that the State is not covered by this Opinion, a brief discussion of this subject may be helpful.

The "value of vested benefits" represents the single premium value under the plan's investment income and mortality assumptions of all

benefits to present and former employees which do not have future employment by the employee as a required condition for their receipt. Thus it includes the present value of an immediate or deferred pension for all pensioners, beneficiaries, vested former employees, and active participants with at least ten years of service. For active employees with less than ten years of service, only the accumulated employee contributions are included, since that is all such employees would receive if they had no further employment.

For the Employee's Retirement System, the value of vested benefits as of June 30, 1978 is as follows:

	<u>State Employees</u>	<u>Teachers</u>
Active members	\$226,313,100	\$208,316,600
Retired members	<u>141,583,700</u>	<u>184,288,200</u>
Total value of vested benefits	\$367,896,800	\$392,604,800
Assets	<u>168,524,700</u>	<u>135,249,800</u>
Unfunded value of vested benefits	<u>\$199,372,100</u>	<u>\$257,355,000</u>

#### Overall Status of System

Legislation during 1978 further strengthened the System's commitment toward fulfilling its pension obligations. The present funding law requires that the full normal cost plus an increasing percentage of the actuarial liability payment be contributed each year as follows:

<u>Fiscal year beginning July 1</u>	<u>Normal cost plus x percent of 30-year amortization of unfunded actuarial liability</u>
1979	70%
1980	80
1981	90
1982 and later	100

This formula comes closer to meeting the actual cost than that under the previous law, both in terms of increasing the transition percentages and reducing the transition period. Under the prior formula, the full cost would not have been contributed until July 1, 1985. The present formula provides for full cost contributions beginning July 1, 1982. The accelerated funding will also result in a lower ultimate cost to the System as underpayments during the transition period, which must be funded over future years, will be less than under the former funding patterns.

It is our feeling that, through this legislation, the State has taken a major step in securing the benefits promised to the System's present and future retirees and beneficiaries.

MARTIN E. SEGAL COMPANY  
INCORPORATED

607 BOYLSTON STREET - BOSTON, MASS. 02116 - (617) 262-0550

December 18, 1978

EMPLOYEES' RETIREMENT SYSTEM OF THE STATE OF RHODE ISLAND

CERTIFICATE OF ACTUARIAL VALUATION

ATLANTA  
CHICAGO  
CLEVELAND  
DALLAS  
DENVER  
HARTFORD  
HOUSTON  
LOS ANGELES  
NEW ORLEANS  
NEW YORK  
PHOENIX  
SAN FRANCISCO  
WASHINGTON, D.C.  
TORONTO

This is to certify that we have prepared an actuarial valuation of the plan as of June 30, 1978.

The certificate contains the following attached exhibits:

EXHIBIT I - Actuarial Cost for Year Beginning July 1, 1978

- A. State Employees
- B. Teachers

EXHIBIT II - Actuarial Assumptions and Funding Method

EXHIBIT III - Summary of Plan Provisions

To the best of my knowledge, the information supplied in this actuarial valuation is complete and accurate (except as noted in Exhibit I) and in my opinion the assumptions used in the aggregate (a) are reasonably related to the experience of the plan and to reasonable expectations and (b) represent my best estimate of anticipated experience under the plan.

MARTIN E. SEGAL COMPANY

*Sherman B. Lieberman*  
By: Sherman B. Lieberman, F.S.A.

EXHIBIT I

ACTUARIAL COST FOR YEAR BEGINNING JULY 1, 1978

A. STATE EMPLOYEES

The valuation was made with respect to the following data supplied to us by the Retirement Board:

- a. 15,543 active participants (including 4,599 fully vested) with total annual salaries of \$190,451,300
- b. 4,017 pensioners (including 159 beneficiaries of deceased pensioners and active employees)

The cost factors as of the valuation date are as follows:

1. Total normal cost .....	\$ 20,009,800
2. Projected employee contributions .....	9,522,600
3. Employer normal cost .....	10,487,200
4. Actuarial liability - total .....	429,381,400
Active employees .....	\$287,797,700
Pensioners (including beneficiaries of deceased pensioners and active employees) .....	141,583,700
5. Assets .....	168,524,700
6. Unfunded actuarial liability .....	260,856,700

Liability for accrued vested benefits: \$367,896,800

Note: Included are 140 active employees unknown as to age, service, or both. Status of beneficiaries was unclear. No data was provided on terminated vested employees, if any.

EXHIBIT I

ACTUARIAL COST FOR YEAR BEGINNING JULY 1, 1978

B. TEACHERS

The valuation was made with respect to the following data supplied to us by the Retirement Board:

- a. 10,850 active participants (including 4,324 fully vested) with total annual salaries of \$176,022,900
- b. 2,684 pensioners (including 64 beneficiaries of deceased pensioners and active employees)

The cost factors as of the valuation date are as follows:

1. Total normal cost .....	\$ 18,763,500
2. Projected employee contributions .....	10,561,400
3. Employer normal cost .....	8,202,100
4. Actuarial liability - total .....	509,579,000
Active employees .....	\$325,290,800
Pensioners (including beneficiaries of deceased pensioners and active employees) .....	184,288,200
5. Assets .....	135,249,800
6. Unfunded actuarial liability .....	374,329,200

Liability for accrued vested benefits: \$392,604,800

Note: Included are 76 active employees unknown as to age, service, or both. Status of beneficiaries was unclear. No data was provided on terminated vested employees, if any.

EXHIBIT II  
ACTUARIAL ASSUMPTIONS AND FUNDING METHOD

Mortality rates -- 1971 Group Annuity Mortality Table

Disability mortality before age 65 -- Age 65 mortality under stipulated table.

Termination rates before retirement:

<u>State Employees (Rate %)</u>				
<u>Age</u>	<u>Death*</u>	<u>Disability</u>	<u>Withdrawal</u>	<u>Total*</u>
20	.05	.06	21.20	21.31
25	.06	.09	15.80	15.95
30	.08	.11	11.60	11.79
35	.11	.15	8.40	8.66
40	.16	.22	6.20	6.58
45	.29	.36	4.20	4.85
50	.53	.61	--	1.13
55	.85	1.01	--	1.86
60	1.31	--	--	1.31

15% of the above disability rates are service-connected.

<u>Teachers (Rate %)</u>				
<u>Age</u>	<u>Death*</u>	<u>Disability</u>	<u>Withdrawal</u>	<u>Total*</u>
20	.05	.06	12.39	12.50
25	.06	.09	9.70	9.85
30	.08	.11	7.50	7.69
35	.11	.15	5.66	5.92
40	.16	.22	4.14	4.52
45	.29	.36	2.75	3.41
50	.53	.61	--	1.13
55	.85	1.01	--	1.86
60	1.31	--	--	1.31

15% of the above disability rates are service-connected.

\* Rates shown are for men; rates for women are slightly lower.

Note: Detail figures may not add to totals shown due to rounding.

Salary scale:

<u>Age</u>	<u>Present salary as a percent of salary at 65</u>	<u>Annual increase (Rate %)</u>
20	17.45	4.84
25	22.07	4.75
30	27.76	4.59
35	34.62	4.39
40	42.68	4.08
45	51.76	3.72
50	61.77	3.45
55	72.98	3.33
60	86.08	3.16

Includes allowance for inflation of 3% per year

Unknown characteristics of employees: Same as those exhibited by employees with known characteristics. Unknown salary is assumed to be \$10,000 for State Employees and \$15,000 for Teachers.

Retirement age -- State Employees: 64, or completion of service requirement if later. Teachers: 63, or completion of service requirement if later.

Post-retirement increases -- 3% per annum, based on original benefit

Percent married -- Social Security awards during 1972

Net investment return -- 6½%

Valuation of assets -- At amortized book value for bonds and at cost for stocks.

Funding method -- Entry age normal cost.

EXHIBIT III  
SUMMARY OF PLAN PROVISIONS

Service pension

	General Employees			Correctional Officers	Legislators		
	60	55	None	50	55	None	
Age requirement:	60	55	None	50	55	None	
Service requirement:	10 yrs.	30 yrs.	35 yrs.	20 yrs.	8 yrs.	20 yrs.	

Amount: 1.7% of final average salary up to 10 years of service plus 1.9% per year for the next 10 years of service plus 2.4% for each additional year of service to a maximum of 80%. Final average salary is defined as the average of compensation earned during the highest 3 consecutive years prior to termination. Correctional officers receive 2% of final average salary per year of service. Legislators receive \$300 per year of service to a maximum of \$6,000. Retirement is mandatory at age 70 except for elected officials. For correctional officers, mandatory retirement is at age 55 or completion of 20 years of service if later.

Early retirement

Age requirement: None  
 Service requirement: 30 years  
 Amount: Regular pension accrued, reduced by 6% for each year of age less than 55.

Disability

Non-occupational:

Age requirement: None  
 Service requirement: 7 years  
 Amount: Regular pension based on service accrued and final average salary at disability (but not less than 26.5%), payable immediately.

Occupational:

Age requirement: None  
 Service requirement: None  
 Amount: 66 2/3% of final salary, payable immediately.

Vesting

Age requirement: None  
 Service requirement: 10 years  
 Amount: Regular pension accrued, payable at age 60.

Pre-retirement death benefits

Lump sum benefit:

Age requirement: None  
 Service requirement: None  
 Amount: (a) \$400 per year of service to a maximum of \$8,000 and with a minimum of \$2,000.  
 (b) Refund of employee contributions.

Spouse's benefit (applicable only if elected by employee):

Age requirement:	60	50	Legislators: none
Service requirement:	10 yrs.	20 yrs.	8 years

Amount: Benefit employee would have received had he retired the day before he died and elected the joint and survivor option.

Occupational death benefit:

Age requirement: None  
 Service requirement: None  
 Amount: (a) 50% of salary to spouse or children under age 18, less workmen's compensation.  
 (b) Refund of employee contributions.

Post-retirement death benefit

Lump sum benefit:

- (a) 100% of employee contributions, less benefits paid.
- (b) Pre-retirement death benefit, reduced 25% per year of retirement, but not less than \$2,000.

Employee contribution rate:

Date	State Employees	Teachers	Legislators
Prior to 7/1/79	5 %	6 %	30%
7/1/79 - 6/30/80	5½	6½	30
7/1/80 - 6/30/81	6	7	30
7/1/81 and later	6½	7½	30

Available options:

Joint and survivor with 50% or 100% continued to the beneficiary after the death of the employee.

Post-retirement cost-of-living increases:

3% of original amount, not compounded, to pensioners and beneficiaries. No cost-of-living increases to legislators.