

*Report
of the
Actuary*

EMPLOYEES' RETIREMENT SYSTEM
OF THE STATE OF RHODE ISLAND

Actuarial Valuation as of
June 30, 1986

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MARTIN E. SEGAL COMPANY

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January 7, 1987

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

Dear Members of the Board:

We are pleased to submit herewith our Actuarial Valuation of the Employees' Retirement System of the State of Rhode Island as of June 30, 1986.

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. Donald R. Hickey, 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.

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 COST METHOD
 - VI. RESULTS OF VALUATION
- APPENDIX

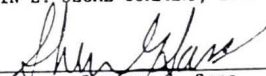
Appended to this report is our actuarial certificate detailing the cost factors, assumptions, and plan of benefits used for the valuation.

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

Sincerely,

MARTIN E. SEGAL COMPANY, INCORPORATED

By



Sherman G. Sass

Senior Vice President

By



James R. Laws, F.S.A., M.A.A.A

Vice President and Actuary

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I. SUMMARY

Benefit Provisions

The Employees' Retirement System of the State 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 7 1/2* per cent of their annual earnings and Teachers contribute 8 1/2* per cent.

The System provides unreduced benefits of 1.7 per cent of earnings for each of the first ten years of service; 1.9 per cent for each of the next ten years; 2.4 per cent per year for each of the next ten years; 6 per cent for the 31st year; 5 per cent for the 32nd year; 4 per cent for the 33rd year; 3 per cent for the 34th year; and 2 per cent for the 35th year. The maximum benefit is 80 per cent of final average earnings after 35 years of service. Such benefits are available to members at least age 60 with 10 years of service, or after 30 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 three consecutive years' earnings. After the third anniversary of 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. Beginning January 1, 1981, the cost-of-living increases are computed at the rate of 3 per cent compounded annually. Effective July 1, 1986 the monthly benefits for all retirees who retired prior to 1980 received increases from 8% to 20% depending on the year of retirement.

The Plan also provides non-service-connected disability after five years of service; service-connected disability pensions with no minimum service requirement; vested benefits after ten years of service; widow's benefits for service-connected death; and certain lump sum death benefits.

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

*Prior to July 1, 1986 the rates were 7 per cent for State employees and 8 per cent for Teachers.

Employee Data

We received data on 14,735 active State Employees and 9,886 Teachers as of June 30, 1986 who were participating in the System. On the average, the State Employees were age 44 and had 10 1/2 years of service; Teachers were age 43 with 16 years of service.

Retiree Data

We received data on 5,861 State Employee pensioners and 455 beneficiaries as of June 30, 1986. The pensioners' average monthly benefit was \$541, which is approximately 11% greater than the average benefit on June 30, 1985. There were 3,131 retired Teachers and 130 beneficiaries; the average monthly benefit was \$1,038 for the pensioners, which is approximately 15% greater than the average benefit a year earlier. The benefit amounts include an adjustment for the cost-of-living provision and the benefit increase which became effective July 1, 1986. Of all the pensioners on the rolls, 7 per cent had retired in the year ended June 30, 1986.

Retirement Fund

As of June 30, 1986, the assets of the Retirement Fund at book value, including Teachers Survivors Reserves, amounted to approximately \$1.047 billion. Effective June 30, 1985, the Board adopted an asset valuation method which recognizes the market value of assets but smoothes the fluctuations in the market value of assets. The asset value on this basis is referred to as the actuarial value of assets. On this basis, the assets amounted to \$1.107 billion as of June 30, 1986. These assets are available as an offset to the actuarial liabilities for future benefits. At market value, assets totalled \$1.339 billion on June 30, 1986.

Actuarial Valuation

The actuarial valuation was prepared as of June 30, 1986. Our calculations were based on reasonable assumptions as to expected future experience. For this valuation we have not revised any of the actuarial assumptions or methods. In our last valuation, as of June 30, 1985, we incorporated the legislated change in the cost method to the entry age

normal cost with frozen initial liability method which became effective July 1, 1985. Funding of the frozen initial liability is based on the sum of the digits amortization basis plus interest on the outstanding liability. The same funding and amortization methods were applied in this valuation. All of the assumptions and methods are detailed in the attached Certificate of Actuarial Valuation.

The employer normal cost* for State Employees is \$7.0 million. This represents 2.4 per cent of the reported payroll of participating State Employees as of June 30, 1986. The employer normal cost for Teachers is \$7.2 million or 2.3 per cent of reported participating payroll.

For State Employees, the unfunded actuarial accrued liability* as of June 30, 1986 is \$420 million. For Teachers, the unfunded actuarial accrued liability as of June 30, 1986 is \$732 million. The unfunded actuarial accrued liabilities as of June 30, 1985 have been "frozen" and are being amortized over 30 years.

The combined value of the System's vested benefits is \$1.65 billion. The assets at actuarial value (excluding assets of the Teachers Survivors program) are short of this amount by \$579 million.

For the 1987-88 fiscal year, the State's statutory funding schedule, as amended effective July 1, 1979, calls for a contribution of 100 per cent of the employer normal cost, 100 per cent of the interest on the unfunded actuarial accrued liability and the second amortization payment on the frozen unfunded liability. For State Employees, these total to \$40.2 million, or 12.5 per cent of the projected 1987-88 payroll of \$321.7 million and for Teachers, the total employer costs are \$64.7 million, or 18.6 per cent of projected payroll of \$347.7 million. (Half of the cost for Teachers is paid for by the municipalities.) In accordance with the statute as amended, the percentages of normal cost and interest on the

unfunded liability required to be contributed have gradually increased to the 100 per cent level starting in fiscal 1985-86. Beginning in fiscal 1986-87, amortization of the frozen unfunded liabilities was also required and has been recognized in the recommendations made in this valuation and the last valuation.

*Please refer to Section V, "Actuarial Assumptions and Cost Method", for definitions of these terms.

II. EMPLOYEE DATA

We received data on 14,735 State Employees and 9,886 Teachers participating in the System on June 30, 1986. The data included age, service, sex, and salary for each participant. The average salary as of June 30, 1986 of the participants was \$19,900 for State Employees and \$31,200 for Teachers. The data included 304 Correctional Officers and 142 Legislators.

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, and a \$15,000 annual salary for Teachers with unknown earnings.

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, the average salary for State Employees increased by 6.4 per cent while Teachers' average salary increased by 8.7 per cent. Aggregate payroll increased by 3.7 per cent for State Employees and by 7.3 per cent for Teachers.

Table 1A
Number and Average Salaries of Employees in Active Service
as of June 30, 1986 by Age and by Years of Service
STATE EMPLOYEES

Age	Total	Years of service										35 and over	Unknown
		0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 and over	Unknown			
Total	14,735 \$19,900	3,737 \$17,600	4,001 \$18,900	3,515 \$20,400	1,869 \$21,900	767 \$24,400	457 \$26,900	176 \$26,700	75 \$28,400	138 \$12,900			
Under 20	8 \$11,400	8 \$11,400	--	--	--	--	--	--	--	--	--	--	
20 - 24	529 \$15,000	478 \$15,000	51 \$15,200	--	--	--	--	--	--	--	--	--	
25 - 29	1,531 \$17,300	811 \$17,500	624 \$17,000	96 \$17,900	--	--	--	--	--	--	--	--	
30 - 34	2,015 \$19,100	582 \$18,700	755 \$19,400	610 \$19,100	68 \$19,100	--	--	--	--	--	--	--	
35 - 39	2,246 \$21,500	513 \$18,900	653 \$20,800	719 \$23,200	340 \$23,200	21 \$18,600	--	--	--	--	--	--	
40 - 44	1,663 \$21,400	414 \$17,800	432 \$20,300	395 \$22,700	290 \$24,500	116 \$25,600	15 \$22,700	--	--	--	--	--	
45 - 49	1,474 \$21,000	315 \$17,800	355 \$19,500	365 \$20,700	207 \$23,600	146 \$26,000	72 \$26,800	11 \$24,600	--	--	--	\$18,500	
50 - 54	1,564 \$20,900	251 \$18,000	373 \$18,500	370 \$20,300	267 \$21,500	136 \$25,600	116 \$28,400	39 \$26,000	11 \$24,100	11 \$28,000	1 \$28,000	6,300	
55 - 59	1,821 \$20,200	268 \$17,100	365 \$18,300	469 \$19,000	326 \$20,500	176 \$23,700	133 \$26,700	62 \$26,500	19 \$27,900	3 \$32,500	3 \$32,500	300	
60 - 64	1,365 \$20,100	88 \$16,900	296 \$18,800	373 \$18,100	295 \$19,900	136 \$22,200	98 \$25,400	44 \$27,900	34 \$29,000	1 \$30,000	1 \$30,000	300	
65 and over	359 \$20,700	4 \$18,700	70 \$18,800	118 \$17,200	76 \$19,900	36 \$24,600	23 \$29,200	20 \$27,200	11 \$31,900	1 \$36,400	1 \$36,400	36,400	
Unknown	160 \$10,200	5 \$11,200	27 \$300	--	--	--	--	--	--	--	--	128 \$12,300	

Table 1B
 Number and Average Salaries of Employees in Active Service
 as of June 30, 1986 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	9,886 \$31,200	725 \$23,200	1,325 \$29,700	2,521 \$31,700	2,863 \$32,200	1,108 \$33,200	606 \$34,100	243 \$35,200	119 \$33,500	376 \$26,900
Under 20	6 \$32,500	--	--	--	--	--	--	--	--	6 \$32,500
20 - 24	37 18,600	28 \$16,500	--	--	--	--	--	--	--	9 25,200
25 - 29	283 22,300	163 20,000	92 \$25,900	2 \$30,600	--	--	--	--	--	26 22,800
30 - 34	1,040 28,700	148 23,200	528 28,800	321 31,300	--	--	--	--	--	43 27,000
35 - 39	2,946 31,100	181 24,800	289 30,700	1,454 31,500	960 \$31,900	3 \$32,800	--	--	--	59 28,600
40 - 44	2,032 31,900	106 24,500	189 30,800	334 32,200	1,046 32,500	312 33,100	2 \$31,300	--	--	43 29,800
45 - 49	1,247 32,600	46 25,200	107 30,400	172 31,900	325 32,400	421 33,800	146 34,600	2 \$41,700	--	28 30,400
50 - 54	940 33,100	24 29,700	53 31,700	110 32,000	219 32,500	157 33,400	255 34,300	90 34,600	16 \$32,400	16 27,600
55 - 59	755 33,200	7 30,900	35 33,500	78 33,000	207 32,000	119 32,500	128 33,800	110 35,600	55 34,200	16 31,900
60 - 64	338 32,500	5 28,500	16 29,500	30 31,900	87 31,600	70 32,000	56 33,400	34 35,500	31 34,200	9 31,800
65 and over	95 31,000	5 22,500	4 25,500	4 31,700	14 32,700	24 31,700	18 33,700	6 33,000	10 34,000	10 24,100
Unknown	167 25,200	12 22,000	12 28,100	16 32,000	5 32,200	2 33,900	1 31,000	1 30,000	7 27,400	111 23,600

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Table 2A
 Statistical Data on Active State Employees
 on June 30, 1986 and 1985

	June 30, 1986	June 30, 1985
Number of covered employees	14,735	15,186
Total annual salary	\$293,816,800	\$283,242,600
Average annual salary	\$19,900	\$18,700
Average age	44	43 1/2
Average years of service	10 1/2	10
Number eligible for service retirement	1,406	1,366
Number vested but not eligible to retire	5,453	5,401

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Table 2B

Statistical Data on Active Teachers
on June 30, 1986 and 1985

	June 30, 1986	June 30, 1985
Number of covered employees	9,886	10,016
Total annual salary	\$308,439,200	\$287,480,600
Average annual salary	\$31,200	\$28,700
Average age	43	43
Average years of service	16	15 1/2
Number eligible for service retirement	665	774
Number vested but not eligible to retire	6,795	6,861

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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	5,861	3,131
Average age	70 1/2	73
Average monthly benefit	\$541	\$1,038
Beneficiaries:		
Number	455	130
Average age	72	72
Average monthly benefit	\$467	\$690

The average monthly benefit amounts shown above and those included in the tables which follow reflect the benefit increases which became effective July 1, 1986. These increases vary from 8% to 20% depending on the original retirement date.

Table 3A shows a distribution of the 453 State Employee pensions which became effective during the 1985-86 fiscal year by type and amount of pension. Table 4A shows a distribution of these same new awards by type of pension and age at retirement. Tables 3B and 4B are the corresponding distributions for the 219 Teacher pensions which became effective during the 1985-86 fiscal year.

Tables 5A and 5B show distributions for all pensions in force as of June 30, 1986 by type and amount of pension. Tables 6A and 6B show distributions of these same retirees by type of pension and age as of June 30, 1986.

Overall, the data on retirees was quite good. A minor problem, which has no impact on cost, is that some beneficiaries may not be classified as such and therefore they would be treated as pensioners.

The data on terminated employees with vested rights to a deferred benefit did not include enough information to calculate the total cost for them. We therefore continued past practice of including an actuarial liability equal to their accumulated employee contributions. We again recommend that information regarding terminated vested employees be obtained and maintained by the System so that it can be incorporated in future valuations and better reflected in the actuarial cost calculations.

Table 3A

Pensions Awarded in the Year Ended June 30, 1986
by Type and by Monthly Amount

STATE EMPLOYEES

Monthly amount	Total	Type of pension				
		Service	Ordinary Disability	Accidental Disability	Legislator	Beneficiary
Total	453	392	29	7	10	15
Under \$50	5	4	--	1	--	--
50 - 99	7	5	--	2	--	--
100 - 149	13	10	2	1	--	--
150 - 199	31	23	7	--	--	1
200 - 249	40	32	5	1	2	--
250 - 299	36	32	1	--	2	1
300 - 349	46	41	--	--	2	3
350 - 399	34	26	5	--	2	1
400 - 449	29	25	2	--	--	2
450 - 499	28	24	2	1	1	--
500 - 599	22	19	1	--	1	1
600 - 699	20	17	1	--	--	2
700 - 799	17	17	--	--	--	1
800 - 899	20	17	3	--	--	1
900 - 999	14	11	--	1	--	2
1,000 - 1,099	8	8	--	--	--	--
1,100 - 1,199	11	11	--	--	--	--
1,200 - 1,299	8	8	--	--	--	--
1,300 - 1,399	9	8	--	--	--	1
1,400 - 1,499	6	6	--	--	--	1
1,500 - 1,999	25	25	--	--	--	--
2,000 - 2,499	15	15	--	--	--	--
2,500 - 2,999	9	8	--	--	--	1

Table 3B

Pensions Awarded in the Year Ended June 30, 1986
by Type and by Monthly Amount

TEACHERS

Monthly amount	Total	Type of pension			
		Service	Ordinary Disability	Accidental Disability	Beneficiary
Total	219	203	7	1	8
\$ 50 - 99	1	--	--	1	--
250 - 299	1	1	--	--	--
300 - 349	2	2	--	--	--
350 - 399	3	2	--	--	1
400 - 449	4	2	1	--	1
450 - 499	1	1	--	--	--
500 - 599	7	3	1	--	3
600 - 699	14	12	1	--	1
700 - 799	14	11	1	--	2
800 - 899	10	10	--	--	--
900 - 999	6	6	--	--	--
1,000 - 1,099	12	11	1	--	--
1,100 - 1,199	14	13	1	--	--
1,200 - 1,299	10	9	1	--	--
1,300 - 1,399	9	9	--	--	--
1,400 - 1,499	11	11	--	--	--
1,500 - 1,999	68	68	--	--	--
2,000 - 2,499	25	25	--	--	--
2,500 - 2,999	7	7	--	--	--

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Table 4A

Pensions Awarded in the Year Ended June 30, 1986
by Type and by Age on Effective Date

STATE EMPLOYEES

Age on effective date	Total	Type of pension				
		Service	Ordinary Disability	Accidental Disability	Legislator	Beneficiary
Total	453	392	29	7	10	15
25 - 29	1	--	--	--	--	1
30 - 34	1	--	--	1	--	--
35 - 39	1	--	1	--	--	--
40 - 44	3	--	3	--	--	--
45 - 49	5	1	2	--	--	2
51	1	1	--	--	--	--
52	24	2	--	--	--	1
53	12	9	2	--	--	1
54	8	3	3	--	1	1
55	13	6	1	1	5	--
56	6	1	1	--	--	4
57	54	10	9	1	--	--
58	11	7	4	--	--	--
59	14	7	5	--	--	2
60	58	55	2	--	1	--
61	41	35	3	2	1	--
62	241	71	68	1	1	1
63	47	43	--	2	1	1
64	24	22	--	1	--	1
65	39	39	--	--	--	--
66	19	19	--	--	--	--
67	99	16	16	--	--	--
68	8	8	--	--	--	--
69	17	17	--	--	--	--
70 and over	24	24	--	--	--	--

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Table 4B

Pensions Awarded in the Year Ended June 30, 1986
by Type and by Age on Effective Date

TEACHERS

Age on effective date	Total	Type of pension			
		Service	Ordinary Disability	Accidental Disability	Beneficiary
Total	219	203	7	1	8
35 - 39	1	--	1	--	--
45 - 49	2	--	1	--	1
50	3	--	1	--	2
51	4	3	1	--	--
52	2	1	--	--	1
53	7	6	--	--	1
54	7	7	--	--	--
55	13	11	2	--	--
56	9	7	--	1	1
57	9	9	--	--	--
58	13	12	1	--	--
59	12	12	--	--	--
60	37	37	--	--	--
61	29	29	--	--	--
62	16	15	--	--	1
63	10	9	--	--	1
64	15	15	--	--	--
65	15	15	--	--	--
66	5	5	--	--	--
67	4	4	--	--	--
68	2	2	--	--	--
69	1	1	--	--	--
70 and over	3	3	--	--	--

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Table 5A

Pensions in Payment Status on June 30, 1986
by Type and by Monthly Amount

STATE EMPLOYEES

Monthly amount	Total	Type of pension				
		Service	Ordinary Disability	Accidental Disability	Legislator	Beneficiary
Total	6,316	5,157	458	102	144	455
Under \$50	20	14	--	5	--	1
\$ 50 - 99	203	151	17	11	--	24
100 - 149	430	368	21	8	--	33
150 - 199	710	577	78	7	--	48
200 - 249	652	510	96	4	6	36
250 - 299	534	399	68	8	20	39
300 - 349	478	372	33	4	25	44
350 - 399	386	297	37	2	19	31
400 - 449	307	240	26	2	14	25
450 - 499	271	235	13	4	6	13
500 - 599	464	356	21	11	30	46
600 - 699	328	249	14	12	24	29
700 - 799	272	227	11	8	--	26
800 - 899	232	204	13	3	--	12
900 - 999	196	170	4	7	--	15
1,000 - 1,099	115	105	2	3	--	5
1,100 - 1,199	106	100	1	--	--	5
1,200 - 1,299	92	88	--	--	--	4
1,300 - 1,399	87	79	2	--	--	6
1,400 - 1,499	87	83	1	2	--	1
1,500 - 1,999	226	216	--	1	--	9
2,000 - 2,499	74	73	--	--	--	1
2,500 - 2,999	29	28	--	--	--	1
3,000 - 3,499	14	13	--	--	--	1
3,500 - 3,999	3	3	--	--	--	--

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Table 5B

Pensions in Payment Status On June 30, 1986
by Type and by Monthly Amount

TEACHERS

Monthly amount	Total	Type of pension			
		Service	Ordinary Disability	Accidental Disability	Beneficiary
Total	3,261	3,006	109	16	130
\$ 50 - 99	4	3	--	1	--
100 - 149	15	14	--	--	1
150 - 199	22	18	--	--	4
200 - 249	35	28	3	--	4
250 - 299	49	44	2	--	3
300 - 349	65	58	3	--	4
350 - 399	64	47	7	1	9
400 - 449	77	58	9	--	10
450 - 499	94	81	7	--	6
500 - 599	187	153	13	--	21
600 - 699	215	192	10	1	12
700 - 799	230	196	19	--	15
800 - 899	297	275	14	--	8
900 - 999	279	263	5	--	11
1,000 - 1,099	285	268	10	1	6
1,100 - 1,199	287	277	4	1	5
1,200 - 1,299	232	223	1	6	2
1,300 - 1,399	205	197	2	3	3
1,400 - 1,499	174	170	--	1	3
1,500 - 1,999	352	349	--	--	3
2,000 - 2,499	73	72	--	1	--
2,500 - 2,999	18	18	--	--	--
3,000 - 3,499	1	1	--	--	--
3,500 - 3,999	1	1	--	--	--

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Table 6A

Pensions in Payment Status on June 30, 1986
by Type and by Age

STATE EMPLOYEES

Age on June 30, 1986	Total	Type of pension				
		Service	Ordinary Disability	Accidental Disability	Legislator	Beneficiary
Total	6,316	5,157	458	102	144	455
30 - 34	10	--	6	1	--	3
35 - 39	11	--	6	3	--	2
40 - 44	22	--	11	6	--	5
45 - 49	25	--	17	4	1	3
50 - 54	79	20	32	13	5	9
55 - 59	257	111	71	16	29	30
60 - 64	983	763	116	19	29	56
65 - 69	1,622	1,413	102	16	21	70
70 - 74	1,540	1,347	62	14	31	86
75 - 79	1,005	861	32	7	11	94
80 - 84	487	425	3	3	7	49
85 - 89	205	166	--	--	7	32
90 - 94	59	45	--	--	2	12
95 - 99	10	6	--	--	1	3
100 - 104	1	--	--	--	--	1

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Table 6B

Pensions in Payment Status on June 30, 1986
by Type and by Age

TEACHERS

Age on June 30, 1986	Total	Type of pension				Beneficiary
		Service	Ordinary Disability	Accidental Disability		
Total	3,261	3,006	109	16	130	
35 - 39	3	---	3	---	2	
40 - 44	7	---	4	1	3	
45 - 49	11	---	7	1	10	
50 - 54	37	13	12	2	9	
55 - 59	130	100	17	4	13	
60 - 64	442	401	25	3	13	
65 - 69	652	618	18	3	18	
70 - 74	607	577	10	2	24	
75 - 79	695	664	7	---	23	
80 - 84	429	404	2	---	10	
85 - 89	170	158	2	---	3	
90 - 94	61	56	2	---	1	
95 - 99	15	14	---	---	1	
100 - 104	1	---	---	---	---	
105 - 109	1	1	---	---	---	

RHODE ISLANDERS

MARTIN E. SEGAL COMPANY

IV. RETIREMENT FUND

The State maintains the Employees' Retirement Fund. The Retirement Board provided us with financial statements as of June 30, 1986.

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 from 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 provides a summary of income and expenditures for the years ended June 30, 1986 and 1985.

On June 30, 1986, assets as reported by the State totalled approximately \$1.047 billion. Table 8 shows the composition of the assets and compares them to those of the previous year. About 68 per cent of the Fund was invested in fixed income securities such as bonds and notes. This represents little change from a year earlier when the fixed income percentage was 67 per cent.

The financial statements indicate that 48 1/2 per cent of the assets relate to State Employees, 48 per cent are for Teachers, and 3 1/2 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 as of June 30, 1986 and 1985.

Assets prior to June 30, 1985 were carried at values as reported by the State. Bonds were carried at amortized cost value and stocks were carried at cost value. Beginning with the June 30, 1985 actuarial valuation, the Board adopted an asset valuation method for actuarial cost

MARTIN E. SEGAL COMPANY

purposes which takes fair market value into account without subjecting the system to abnormal cost fluctuations from year to year as a result of short term changes in market value.

On the "actuarial value" basis, the assets on June 30, 1986 amounted to \$1,107,357,824. The development of this amount is shown in the following chart:

Determination of Actuarial Value of Assets

1. Actuarial value of assets at beginning of year	\$ 896,469,211
2. Net new money (including dividends and interest)	153,068,193
3. Preliminary value of assets at end of year: (1) + (2)	1,049,537,404
4. Market value of assets at end of year	1,338,639,504
5. Minimum actuarial value: 80% of (4)	1,070,911,603
6. Maximum actuarial value: 120% of (4)	1,606,367,405
7. Trial write-up: 20% of [(4) - (3)]	57,820,420
8. Trial actuarial value: (3) + (7)	1,107,357,824
9. Final actuarial value of assets at end of year: (8), but not less than (5) or more than (6)	1,107,357,824
10. Final write-up: (9) - (3)	57,820,420

This determination is used for two purposes:

First, the actuarial value is applied in determining the value of assets used in the actuarial calculations to determine the annual costs.

Second, the amount of write-up or write-down is considered part of the investment yield for the year. This procedure treats realized and unrealized capital gains equally. In other words, the sale of a security - either at a gain or loss - will have no effect on the actuarial value. This should remove from the area of investment decisions any consideration of the impact of security sales on the actuarial cost of the plan.

Table 7

Summary Statement of Income and Expenses
For the Years Ended June 30, 1986 and 1985

	1986	1985
Employer contributions	\$103,521,261	\$ 93,268,916
Member contributions	<u>46,364,171</u>	<u>38,408,903</u>
Total contributions	\$149,885,432	\$131,677,819
Less: Administration expenses	--	<u>60</u>
Net contribution income	\$149,885,432	\$131,677,759
Net miscellaneous items	<u>422,501</u>	380,025
Investment income:		
Dividends	\$16,847,105	\$14,881,642
Interest	65,620,860	56,626,076
Capital gains and (losses) and sale of options/calls	19,299,989	(480,842)
Expenses	<u>741,277</u>	--
Net investment income	101,026,678	<u>71,026,876</u>
Total income available for benefit payments	\$251,334,611	\$203,084,660
Benefits payments:		
Pension benefits	\$73,808,887	\$67,189,315
Death benefits	1,233,814	1,169,140
Contribution refunds	<u>3,923,728</u>	<u>4,369,958</u>
Total benefit payments	78,966,429	<u>72,728,414</u>
Excess of income over expenses	<u>\$172,368,182</u>	<u>\$130,356,247</u>

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

Table 4

Amounts in \$ from 1970, 1980 and 1985

	1980	1985
Land (acquired)	\$ 10,770,000	\$ 2,650,133
Residual balances attributable	18,253,088	12,579,752
to:		
Government Bonds	307,489,482	852,517,008
Corporate Bonds	97,127,200	90,879,000
Common and preferred stocks	112,807,662	270,628,125
and other securities		73,850,000
Cash deposits of deposits	87,030,000	81,849,141
and other assets	108,790,572	400,000
Common and preferred	500,000	
stocks		
(1980) Common and preferred	51,021,877,417	57,402,916
stocks	15,232,229	10,110,507
(1985)	1,000,000,000	876,612,812

Note: (1985) figures may not add to totals shown because of rounding.

Source: FDICID 882

AMERICA'S BRIGHT COMPASS

Table 5

Amounts in \$ from 1970 and 1985

	1980	1985
Land (acquired)	\$ 10,770,000	\$ 2,650,133
Residual balances attributable	18,253,088	12,579,752
to:		
Government Bonds	307,489,482	852,517,008
Corporate Bonds	97,127,200	90,879,000
Common and preferred stocks	112,807,662	270,628,125
and other securities		73,850,000
Cash deposits of deposits	87,030,000	81,849,141
and other assets	108,790,572	400,000
Common and preferred	500,000	
stocks		
(1980) Common and preferred	51,021,877,417	57,402,916
stocks	15,232,229	10,110,507
(1985)	1,000,000,000	876,612,812

Note: (1985) figures may not add to totals shown because of rounding.

Source: FDICID 882

AMERICA'S BRIGHT COMPASS

V. ACTUARIAL ASSUMPTIONS AND COST METHOD

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 service that gives rise to the pension obligation. The result is series of employer contributions over a long period of years. 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. The assumptions applied in this valuation are the same as those used in the June 30, 1985 study. Beginning with the June 30, 1985 actuarial valuation, the actuarial cost method was changed as stipulated in Section 36-10-2 of the General Laws of Rhode Island. This method is reviewed at the end of this Section.

Mortality Rates

We continue to apply mortality rates taken from the Male and Female 1971 Group Annuity Mortality Tables. These are the most commonly used tables of pension plan mortality, and we believe they continue to be reasonable for estimating experience under the System. Table 10 gives some life expectancies determined from these tables.

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 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 is young and a lower per cent of his higher salary at a later age. Establishing pension costs which remain a level percentage of salary means that pension costs will be incurred at the same rate as salary is paid to an employee.

The projection of future salaries must anticipate, among other items, future general salary increases. Over the long term, it can be expected that these will parallel or slightly exceed the level of inflation. If the salary increase assumption exceeds actual future salary increases, then pension contributions will exceed the actual cost requirement and actuarial gains will develop. Alternatively, if future salary increases exceed the assumption, then pension contributions will be less than the actual cost requirement and actuarial losses will develop.

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

<u>Age</u>	<u>Present Salary as a % of Age 65 Salary</u>	<u>Annual Increases (Rate %)</u>
20	11.30	5.85
25	15.00	5.77
30	19.79	5.61
35	25.91	5.41
40	33.52	5.09
45	42.66	4.73
50	53.43	4.45
55	66.26	4.34
60	82.02	4.17

to such extent, the portion of which production has a bearing on the portion of working to which it is to be made available, under the no-revenue investment.

Production Costs

Production costs for a given effort in the production of a commodity are the resources, materials, energy, and other factors which are necessary to produce the commodity. The production cost of a commodity is the sum of the resources used in the production of that commodity.

In production with two inputs, labor and capital, the production function can be written as $Y = A \cdot L^\alpha \cdot K^\beta$, where Y is output, L is labor, K is capital, and A is a constant. The production function shows that the output is a function of the inputs and the technology.

In the long-run situation, the production function is assumed to be constant. This assumption allows the production function to be written as $Y = A \cdot L^\alpha \cdot K^\beta$, where Y is output, L is labor, K is capital, and A is a constant. The production function shows that the output is a function of the inputs and the technology.

Production Costs

In the long-run situation, the production function is assumed to be constant. This assumption allows the production function to be written as $Y = A \cdot L^\alpha \cdot K^\beta$, where Y is output, L is labor, K is capital, and A is a constant. The production function shows that the output is a function of the inputs and the technology.

The following table provides information regarding the data used in the production function model.

Table 1: Data for the production function model.

Year	Capital	Production	Output	Input
1950	40	100	100	100
1955	60	150	150	150
1960	80	200	200	200
1965	100	250	250	250
1970	120	300	300	300
1975	140	350	350	350
1980	160	400	400	400
1985	180	450	450	450
1990	200	500	500	500
1995	220	550	550	550

Table 1 provides information regarding the data used in the production function model.

Table 2: Data for the production function model.

Year	Capital	Production	Output	Input
1950	40	100	100	100
1955	60	150	150	150
1960	80	200	200	200
1965	100	250	250	250
1970	120	300	300	300
1975	140	350	350	350
1980	160	400	400	400
1985	180	450	450	450
1990	200	500	500	500
1995	220	550	550	550

Table 2 provides information regarding the data used in the production function model.

Table 3 provides information regarding the data used in the production function model.

Table 4 provides information regarding the data used in the production function model.

Retirement Ages

The System provides unreduced benefits upon completion of 30 years of service for general employees and age 50 for State Correctional Officers. We assume State Employees will retire at age 63, or upon the completion of ten years of service if later. Teacher retirements are assumed to occur when the teacher has attained age 61 1/2 and completed ten or more years of service. In any case where the employee already meets these assumed conditions of age and service, it is assumed that he or she will retire immediately.

Post-Retirement Increases

Following the third anniversary of retirement, cost-of-living increases are regularly provided to pensioners. Our calculations recognize the 3 per cent annual benefit increase provided by Statute. Cost-of-living increases are now "compounded" from year to year. With this valuation we took into account the adjustment effective January 1, 1987 and all subsequent 3% increases.

Actuarial Cost Method

This valuation is performed using the Entry Age Normal Cost Method with Frozen Initial Liability, hereafter referred to as the Frozen Initial Liability Method. The change from Entry Age Normal Cost Method was legislated effective with the July 1, 1985 actuarial valuation.

Under the Frozen Initial Liability Method, the Actuarial Present Value of Benefits for all participants (including both past and future benefit accruals) is divided into three components, as follows:

- (a) Assets on hand (i.e., benefits already funded);
- (b) Unfunded Frozen Initial Liability, which equals the unfunded actuarial accrued liability as of June 30, 1985 based on the Entry Age Normal Cost Method, adjusted each year for expected reductions, the effect of plan amendments, and the effect of changes in actuarial assumptions; and

- (c) Actuarial Present Value of Future Normal Costs, which is the balance, and which effectively includes all variations from expected experience.

The annual cost requirement consists of three items -- (1) the amount which will amortize the principal portion of the Unfunded Frozen Initial Liability over 30 years from July 1, 1986 using the sum-of-the-digits method plus (2) the interest on the outstanding balance of the Unfunded Frozen Initial Liability plus (3) the Normal Cost, which is the percent of payroll which will fund the Actuarial Present Value of Future Normal Costs over the working lifetime of the active participants. The Normal Cost is calculated as a level percent of pay and the amortization payment is calculated as an increasing dollar amount. The interest cost on the outstanding balance of the Unfunded Frozen Initial Liability will decrease each year as the outstanding balance is reduced.

Overall Actuarial Basis

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

Missing Data

It was necessary to make certain "non-actuarial" assumptions where data was missing or incomplete with respect to some individual participants. In all cases, we assumed such individuals had the same average characteristics as other participants within the same category (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.

RHODE ISLAND ERS

VI. RESULTS OF VALUATION

State Employees

The costs for State Employees as of June 30, 1986, including all benefit changes through that date, developed as follows:

<u>Item</u>	<u>Amount</u>	<u>% of Payroll</u>
(1) Participating payroll	\$293,816,800	--
(2) Employer normal cost	7,017,400	2.3884%
(3) Frozen unfunded actuarial liability as of July 1, 1986	419,546,700	--
(4) Interest on unfunded actuarial liability	29,270,500	10.0
(5) Amortization payment	1,761,000	0.6

The funding statute calls for the State to contribute 100 per cent of the projected normal cost plus 100 per cent of the interest on the unfunded actuarial accrued liability (as of June 30, 1986) plus an amortization payment equal to two times 0.215% of the frozen unfunded liability as of June 30, 1985 plus the increase in liability for changes in liability of more than 1% of the outstanding unfunded liability for the 1987-88 fiscal year. Based on this requirement and a projected participating payroll of \$321,700,000, the 1987-88 employer contribution "rate per cent" for State Employees is 12.5 per cent of payroll as developed below.

<u>Item</u>	<u>Amount</u>	<u>% of Projected Payroll</u>
(6) Projected 1987-88 participating payroll	\$321,700,000	--
(7) 1987-88 employer normal cost = 2.3884% x (6)	7,683,500	2.4%
(8) Required contribution payable July 1, 1987 = 1.00 x (7) + 1.00 x (4) + 1.00 x (5)	38,715,000	12.0
(9) Required contribution payable monthly = (8) plus interest adjustment	40,166,800	12.5

The calculations, as completed through line 8 on the previous page, determine the employer contribution to be paid into the retirement fund at the beginning of each year with interest earnings starting from that date. However, contributions to the Fund are made monthly. Thus, about half a year's interest is lost, and the contribution must be increased to reflect this. Line 9 on the previous page reflects this adjustment.

The "rate per cent" of 12.5 per cent of payroll (shown on line 9) is the same as the previous year.

Teachers

The costs for Teachers as of June 30, 1986, including all benefit changes through that date, developed as follows:

<u>Item</u>	<u>Amount</u>	<u>% of Payroll</u>
(1) Participating payroll	\$308,439,200	--
(2) Employer normal cost	7,199,500	2.3342%
(3) Frozen unfunded actuarial liability as of July 1, 1986	732,327,300	—
(4) Interest on unfunded actuarial liability	51,092,300	16.6
(5) Amortization payment	3,113,900	1.0

Applying the funding statute to the Teachers' costs and a projected participating payroll of \$347,700,000 results in a contribution "rate per cent" requirement for fiscal 1987-88 of 18.6 per cent. Half of this rate (9.30%) is payable by the State and half by the municipalities. The "rate per cent" is developed as follows:

<u>Item</u>	<u>Amount</u>	<u>% of Participating Payroll</u>
(6) Projected 1987-88 participating payroll	\$347,700,000	--
(7) 1987-88 employer normal cost = 2.3342% x (6)	8,116,000	2.3%
(8) Required contribution payable July 1, 1987 = 1.00 x (7) + 1.00 x (4) + 1.00 x (5)	62,322,200	17.9
(9) Required contribution payable monthly = (8) plus interest adjustment	64,659,300	18.6

The calculations, as completed through line 8 above, assume that the employer contributions will be paid into the retirement fund at the beginning of each fiscal year and will start to earn interest from that date. However, contributions will be deposited monthly so that approximately half a year's interest is lost, and the contribution must be increased to reflect this. Line 9 above reflects this adjustment.

The "rate per cent", measured by line 9 above, is 18.6 per cent of payroll. This compares to 18.9 per cent for the previous year.

Teacher Survivors

Because data on dependents of teachers is not available, it is not possible to do a thorough analysis of the Teachers Survivor program. However, through the use of assumed ages for members and their spouses and children, we were able to determine that the current assets of \$36.8 million together with the future income will be sufficient to cover the actuarial liabilities of this program. Currently the employee and the employer each contribute one per cent of salary up to \$9,600 for a maximum contribution of \$192 annually. Contributions in recent years on behalf of the approximate 5,500 members have been approximately \$1 million while the benefit payments have generally been somewhat less. For the 1985-86 year, contributions totalled \$1,026,000 and benefit payments were \$1,044,000.

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 provision for pension expense, 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 may not be covered by this Opinion, a brief discussion of this subject may be helpful.

The "value of vested benefits" represents the single sum value, based on the Plan's investment return, mortality, and retirement age 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, and active participants with at least ten years of service. For active employees with less than ten years of service and inactive vested employees, only the accumulated employee contributions are included.

For the Employees' Retirement System, the value of vested benefits as of June 30, 1986 is as follows:

	<u>State Employees</u>	<u>Teachers</u>
Active members	\$367,451,400	\$465,333,500
Inactive members	6,013,100	10,175,600
Retired members	<u>417,011,600</u>	<u>381,429,400</u>
Total value of vested benefits	\$790,476,100	\$856,938,500
Assets at actuarial value	<u>535,184,800</u>	<u>533,018,300</u>
Unfunded value of vested benefits	<u>\$255,291,300</u>	<u>\$323,920,200</u>

Overall Status of System

Legislation in January, 1979 effectively returned the System to its former statutory funding schedule beginning with the 1979-80 fiscal year. (Actually, the accelerated funding provided for by the General Assembly in 1978 was never used as the basis for determining contributions as its effective date was deferred for one year to July 1, 1979, by which date the further revision of the law superseded it.)

As the funding law currently exists, beginning with the fiscal year starting July 1, 1986, the statutory contribution comprises the normal cost, amortization of the June 30, 1985 unfunded liability and certain changes in that liability based on the sum-of-the-digits method over 30 years, and interest on the outstanding balance of the unfunded liability.

We believe that the funding program as set forth in the state statute is a reasonable basis for funding the Rhode Island Retirement System. If the statutory funding program is followed without change, the System will be fully funded--that is, the assets will equal the actuarial liability on June 30, 2016. In the interim, the assets are projected to be sufficient at all times to meet the cash requirements for projected benefit payments.

* * * * *

APPENDIX

MODEL FORM SUMMARY STATEMENT RE CITY AND TOWN PARTICIPATION
IN TEACHERS' RETIREMENT SYSTEM FOR PURPOSES OF
FINANCIAL STATEMENTS AND REPORTS,
MUNICIPAL BOND REGISTRATION STATEMENTS, ETC.

The (city) (town) of _____ provides retirement benefits to its public school teachers through its participation in the Rhode Island Retirement System, a statutory, mandatory, state-wide, multi-employer retirement system, which first covered Rhode Island teachers on July 1, 1949. This System is administered as a unified state-wide system by the State Retirement Board, the composition of which is set forth in the pertinent state statute. The assets are held in the custody of the State Treasurer as an undivided single fund.

The actuarial costs of the retirement benefits are partially funded by employee contributions of 8 1/2 per cent of pay effective July 1, 1986. The net employer actuarial costs are determined annually by the actuary and as provided by statute are certified by the Retirement Board to the Department of Administration as a rate per cent of payroll, payable one half by the State of Rhode Island and one half by the (city) (town). The statute provided for increasing graduated percentages of the annual normal cost and interest on the unfunded liability until the year beginning July 1, 1986 when the full normal cost and amortization payments on a 30-year schedule are required.

Actuarial valuations prepared by Martin E. Segal Company, applying the entry age normal cost method with the frozen initial liability, assuming 7 1/2 per cent interest return on invested assets and applying assumed rates of salary progression, allowance for post-retirement increases and other actuarial assumptions--all as set forth in the published annual reports of the Retirement Board--reveal the following comparative highlights of the last three years for the Teachers' System as a whole:

	Year Beginning July 1,		
	1984	1985	1986
Active participants	10,003	10,016	9,886
Pensioners and beneficiaries	3,108	3,167	3,261
Inactive participants	1,454	1,946	2,030
Liability for accrued vested benefits	\$768,202,000	\$776,178,300	\$856,938,500
Net assets at actuarial value for 1986 and 1985, and as reported by State for 1984	335,799,800	417,985,200	533,018,300

As shown in State's
financial statements:

	Year Ended June 30,		
	1984	1985	1986
Employer contributions	\$37,514,713	\$ 52,886,808	\$ 60,405,655
Member contributions	<u>17,519,110</u>	<u>20,584,746</u>	<u>24,932,383</u>
Total contributions	\$55,033,823	\$ 73,471,555	\$ 85,338,038
Net miscellaneous income	125,094	121,384	312,202
Investment income	<u>30,374,935</u>	<u>32,639,521</u>	<u>47,947,261</u>
Total income available for benefit payments	\$85,533,852	\$106,232,459	\$133,597,501
Benefit payments	<u>32,358,874</u>	<u>34,417,225</u>	<u>37,444,543</u>
Excess of income over expenses	<u>\$53,174,978</u>	<u>\$ 71,815,234</u>	<u>\$ 96,152,959</u>

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

Actuarial costs and liabilities, as shown in the summary presentation, are determined in the aggregate for the Teachers System. Accordingly, employer contributions are first determined in the aggregate for all participating employers in this multi-employer system; are then expressed as a rate per cent of the aggregate participating payroll; and one half this rate per cent is then promulgated to each participating employer as the actuarial cost factor to be applied to its participating payroll (the remaining one half of the employer cost is contributed by the State). Employer contributions by (city) (town) of _____ for each of the last two years (together with the amount for the current year, based on the promulgated rate per cent of 9.30 per cent) are as follows:

MARTIN E. SEGAL COMPANY

Year Ending June 30,
1984 1985 1986 (est.)

Participating payroll
Employer contributions

With respect to the Teachers Retirement System, Martin E. Segal Company, independent actuaries advising the Retirement Board have stated on January 7, 1987:

"We believe that the funding program set forth in the state statute is a reasonable basis for funding the Rhode Island Teachers Retirement System. If the statutory funding program is followed without change, the System will be fully funded--that is, the assets will equal the actuarial liability on June 30, 2016. In the interim the assets are projected to be sufficient at all times to meet the cash requirements for projected benefit payments."

According to the statutory funding schedule, the contributions required each year of the (city) (town) of _____ and the State will remain relatively level as a percent of payroll as the System moves toward funding the full actuarial liability. Ultimately, however, because the actuarial funding results in the accumulation of reserves that are invested, the required appropriation will be significantly less than would be required if this System were on a pay-as-you-go basis.

MARTIN E. SEGAL COMPANY

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

January 7, 1987

EMPLOYEES' RETIREMENT SYSTEM OF THE STATE OF RHODE ISLAND

CERTIFICATE OF ACTUARIAL VALUATION

This is to certify that we have prepared an actuarial valuation of the plan as of June 30, 1986.

This certificate contains the following attached exhibits:

- EXHIBIT I - Actuarial Cost Development of Fiscal Year
1987-88 Contribution Percentage
 - A. State Employees
 - B. Teachers
- EXHIBIT II - Actuarial Assumptions and Cost 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, INCORPORATED

By: James R. Laws
James R. Laws, F.S.A., M.A.A.A.
Vice President and Actuary

JRL/hva
D43

EXHIBIT I
 ACTUARIAL COST FOR DEVELOPMENT OF
 FISCAL YEAR 1987-88 CONTRIBUTION PERCENTAGE

A. STATE EMPLOYEES

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

- a. 14,735 active participants (including 6,859 fully vested) with total annual salaries of \$293,816,800
- b. 1,675 inactive participants
- c. 6,316 pensioners (including 455 beneficiaries of deceased pensioners and active employees)

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

1. Actuarial present value of benefits - total.....	\$1,202,111,100
Active employees.....	\$779,086,400
Inactive employees.....	6,013,100
Pensioners and beneficiaries.....	417,011,600
2. Actuarial value of assets.....	535,184,800
3. Present value of future employee contributions.....	185,250,100
4. Unfunded frozen actuarial liability.....	419,546,700
5. Actuarial present value of future normal costs (item 1 - item 2 - item 3 - item 4).....	62,129,500
6. Actuarial present value of future compensation.....	2,470,001,100
7. Normal cost percentage (item 5 / item 6).....	2.52%
8. Total compensation of employees below the assumed retirement age.....	\$278,467,900
9. Normal cost (item 7 x item 8).....	7,017,400
10. Interest on unfunded frozen actuarial liability.....	29,270,500
11. Payment required to amortize unfunded frozen actuarial liability over 30 years (29 years remaining from July 1, 1987) in installments which increase in multiples of 0.215% per year.....	1,761,000
12. Total annual cost if paid on July 1, 1986 (item 9 plus item 10 plus item 11).....	38,048,900

(Continued...)

MARTIN E. SEGAL COMPANY

EXHIBIT I
 ACTUARIAL COST FOR DEVELOPMENT OF
 FISCAL YEAR 1987-88 CONTRIBUTION PERCENTAGE

A. STATE EMPLOYEES
 (Continued)

- 13. Total annual cost if paid in uniform installments throughout the year (item 12 plus one-half year's interest).....
- 14. Total annual cost based on 1987-88 projected participating payroll of \$321,700,000 if paid in uniform installments throughout the year.....
- 15. Item 14 amount as a percent of payroll.....

Present value of accrued vested benefits: \$790,476,100

Note: Included are 170 active employees unknown as to age, service, or both. Status of beneficiaries was unclear. The liability included for inactive employees is the sum of their accumulated contributions.

MARTIN E. SEGAL COMPANY

EXHIBIT I
 ACTUARIAL COST FOR DEVELOPMENT OF
 FISCAL YEAR 1987-88 CONTRIBUTION PERCENTAGE
 B. TEACHERS

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

- a. 9,886 active participants (including 7,460 fully vested) with total annual salaries of \$308,439,200
- b. 2,030 inactive participants
- c. 3,261 pensioners (including 130 beneficiaries of deceased pensioners and active employees)

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

1. Actuarial present value of benefits - total	\$1,615,771,200
Active employees	\$1,224,166,200
Inactive employees	10,175,600
Pensioners and beneficiaries	381,429,400
2. Actuarial value of assets	533,018,300
3. Present value of future employee contributions	273,341,900
4. Unfunded frozen actuarial liability	732,327,300
5. Actuarial present value of future normal costs (item 1 - item 2 - item 3 - item 4)	77,083,700
6. Actuarial present value of future compensation	3,215,786,900
7. Normal cost percentage (item 5 / item 6)	2.40%
8. Total compensation of employees below the assumed retirement age	\$299,977,700
9. Normal cost (item 7 x item 8)	7,199,500
10. Interest on unfunded frozen actuarial liability	51,092,300
11. Payment required to amortize unfunded frozen actuarial liability over 30 years (29 years remaining from July 1, 1987) in installments which increase in multiples of 0.215% per year	3,113,900
12. Total annual cost if paid on July 1, 1986 (item 9 plus item 10 plus item 11)	61,405,700

(Continued...)

EXHIBIT I
 ACTUARIAL COST FOR DEVELOPMENT OF
 FISCAL YEAR 1987-88 CONTRIBUTION PERCENTAGE

B. TEACHERS
 (Continued)

13. Total annual cost if paid in uniform installments throughout the year (item 12 plus one-half year's interest)	\$63,708,400
14. Total annual cost based on 1987-88 projected participating payroll of \$347,700,000 if paid in uniform installments throughout the year	64,659,300
15. Item 14 as a percent of payroll	18.6%

Present value of accrued vested benefits: \$856,938,500

Note: Included are 432 active employees unknown as to age, service, or both. Status of beneficiaries was unclear. The liability included for inactive employees is the sum of their accumulated contributions.

EXHIBIT II
ACTUARIAL ASSUMPTIONS AND COST METHOD

Mortality rates -- 1971 Group Annuity Mortality Table

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

Termination rates before retirement:

State Employees (Rate %)

<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	2.60	3.73
55	.85	1.01	--	1.86
60	1.31	--	--	1.31

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

Teachers (Rate %)

<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	1.35	2.49
55	.85	1.01	--	1.86
60	1.31	--	--	1.31

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

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

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

Salary scale:

<u>Age</u>	<u>Present salary as a % of salary at 65</u>	<u>Annual increase (Rate %)</u>
20	11.30	5.85
25	15.00	5.77
30	19.79	5.61
35	25.91	5.41
40	33.52	5.09
45	42.66	4.73
50	53.43	4.45
55	66.26	4.34
60	82.02	4.17

Includes allowance for inflation of 4% 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: 63, or completion of service requirement, if later. Teachers: 61 1/2, or completion of service requirement, if later.

Post-retirement increases -- 3% compounded annually

Percent married -- Social Security awards during 1972

Net investment return -- 7 1/2%

Actuarial value of assets --

Sum of Preliminary Value and write-up, but no more than 120% of market value or less than 80% of market value. Preliminary Value is actuarial value of assets at beginning of the year plus increase in cost value during the year, excluding realized capital gains or losses. Write-up is 20% of market value at end of year in excess of preliminary value.

If Preliminary Value exceeds market value, there is a write-down of assets determined in a similar manner.

Actuarial cost method -- Frozen initial liability method. The method is also referred to as the entry age normal cost method with frozen initial liability.

Entry age is the employee's age at the time he or she would have commenced employment if the plan had always been in existence.

Frozen actuarial liability calculated on an individual basis and the outstanding balance of the unfunded amount is based on expected value regardless of actual contributions. It is funded over the 30-year period ended June 30, 2016. Payment on outstanding balance of unfunded frozen initial liability based on sum of (1) interest on outstanding balance, and (2) a payment towards principal. The principal portion of the payment is based on the sum-of-the-digits amortization method.

EXHIBIT III
SUMMARY OF PLAN PROVISIONS

Service pension

	<u>General Employees</u>		<u>Correctional Officers</u>	<u>Legislators</u>	
Age requirement:	60	None	50	55	None
	or			or	
Service requirement:	10 yrs.	30 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 the next 10 years of service plus 6% for the 31st year plus 5% for the 32nd year plus 4% for the 33rd year plus 3% for the 34th year plus 2% for the 35th year. The maximum benefit is 80% of final average salary after 35 years of service. 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.

Disability

Non-occupational:

Age requirement: None
 Service requirement: 5 years
 Amount: Regular pension based on service accrued and final average salary at disability, payable immediately. The minimum retirement percentage is 17% regardless of service.

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: Sum of (a) \$800 per year of service to a maximum of \$16,000 and with a minimum of \$4,000, and
(b) Refund of employee contributions.

Joint and Survivor benefit (applicable only if elected by employee):

Age requirement: None

Service requirement: 10 years / Legislators: 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: Sum of (a) 50% of salary to spouse or children under age 18, less workmen's compensation, and
(b) Refund of employee contributions.

Post-retirement death benefit

Lump sum benefit: Sum of (a) 100% of employee contributions, less benefits paid, and
(b) Pre-retirement death benefit, reduced 25% per year of retirement, but not less than \$4,000.

Employee contribution rate:

<u>Date</u>	<u>State Employees</u>	<u>Teachers</u>	<u>Legislators</u>
Prior to 7/1/79	5%	6%	30%
7/1/79 - 6/30/82	5 1/2	6 1/2	30
7/1/82 - 6/30/85	6	7	30
7/1/85 - 6/30/86	7	8	30
7/1/86 and later	7 1/2	8 1/2	30

Available options:

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

Post-retirement cost-of-living increases:

3% of current amount, compounded, to pensioners and beneficiaries following the third anniversary of retirement.