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Commonwealth of Massachusetts

ACTUARIAL VALUATION REPORT

AS OF JANUARY 1, 1996

FOR THE

COMMONWEALTH'S TOTAL PENSION OBLIGATION

Division of Public Employee

Retirement Administration

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SECTION I

INTRODUCTION AND CERTIFICATION

This report presents the results of the actuarial valuation of all of the pension benefits which are the obligation of the Commonwealth of Massachusetts as follows:

- State Employees Retirement System
- Massachusetts Teachers' Retirement System
- Boston Teachers
- Cost of Living Allowances to local systems

The valuation was performed as of January 1, 1996 pursuant to G.L. c. 32, as amended by c. 697. The actuarial assumptions used to calculate the accrued liability and the normal cost are the same as those used in the actuarial valuation as of January 1, 1995. It is our opinion that the assumptions used are each reasonably related to the plan experience and expectations.

This valuation was based on member data as of December 31, 1995, which was supplied by the Boston, State, and Teachers' Retirement Boards as well as a selection of local boards for purposes of calculating COLA costs. Such tests as we deemed necessary were performed on the data to ensure accuracy. Asset information as of December 31, 1995 was provided by the Office of the State Treasurer, by the Pension Reserve Investment Management Board through the Comptroller's Office, and by the Annual Statement for the Financial Condition as submitted to this office by the Boston Retirement Board and the State Retirement Board in accordance with G.L. c. 32, ss. 20(5)(h), 23(1)(c) and 23(2)(e).

In our opinion, this report represents an accurate appraisal of the actuarial status of the Commonwealth's total pension obligation performed in accordance with generally accepted actuarial principles and practices relating to pension plans.

Respectfully submitted,
Public Employee Retirement Administration

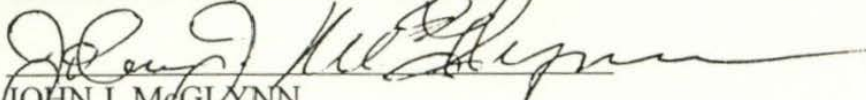


BARBARA J. WARE

Member of the American Academy of Actuaries

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Enrolled Actuary Number 96-3821



JOHN J. McGLYNN

Commissioner

Dated: November 5, 1996

SECTION II
SUMMARY DISCUSSION

PART A Costs under Current Valuation

Section 22C of G.L., c. 32 mandates the establishment of a funding schedule for the Commonwealth of Massachusetts pension obligation. The schedule, as mandated by law, calls for payment of the Normal Cost plus an amortization payment on the Unfunded Actuarial Liability. The amortization payments must be such that the Unfunded Actuarial Liability as of January 1, 1987 is reduced to 0 by June 30, 2028. Under the present schedule, these payments increase at a rate of 2 1/2% per year. In addition, for the first ten years of the schedule (through the fiscal year ending June 30, 1998), the total payment must be no less than the total estimated cost of benefits in each of those years and the Pension Reserve Fund shall not be allowed to decrease its value on January 1, 1988, increased by 8% per year. The funding schedule is due to be revised for FY98.

Actuarial Liability

The results of the January 1, 1996 actuarial valuation are as follows (\$000 omitted):

Retirees and Inactives *	10,114,484	2,636,508	977,916	5.0%
Total Normal Cost	\$22,189,055	\$21,143,251	\$716,099	3.4%
Assets	15,467,239	12,331,001	439,892	25.4%
Unfunded Actuarial Liability	\$6,721,816	\$8,812,250	\$276,207	(23.9%)

* This amount includes COLA in the January 1, 1996 valuation	Total Actuarial Liability	\$22,189,055
	Assets	15,467,239
	Unfunded Actuarial Liability	<u>\$6,721,816</u>

Please see page 6 for more detail of these amounts. For the period from January 1, 1995 to January 1, 1996, the Actuarial Gain was \$1,481,372,000. Lower than assumed increases in payroll and higher than expected returns on assets would account for the State and Teachers (other than Boston Teachers) gain. The higher than expected increase in payroll (8.5%) accounted for the loss for Boston Teachers.

SECTION II
SUMMARY DISCUSSION (Continued)

PART B Comparison with Prior Valuation

Below we have shown the comparison between the current valuation and the January 1, 1995 valuation. The calculations in both reports were based on the same assumptions. (\$000's omitted).

	<u>1/1/96</u>	<u>1/1/95</u>	Increase (Decrease)	Increase (Decrease)
Total Normal Cost	\$716,099	\$681,485	34,614	5.1%
Employee Contributions	439,892	422,662	17,230	4.1%
Net Normal Cost	<u>\$276,207</u>	<u>\$258,823</u>	<u>17,384</u>	6.7%
Actuarial Liability				
Actives	\$12,074,570	\$11,412,663	661,908	5.8%
Retirees and Inactives *	<u>10,114,484</u>	<u>9,636,568</u>	<u>477,916</u>	5.0%
Total	\$22,189,055	\$21,049,231	1,139,824	5.4%
Assets	<u>15,467,239</u>	<u>12,331,001</u>	<u>3,136,238</u>	25.4%
Unfunded Actuarial Liability	<u>\$6,721,816</u>	<u>\$8,718,230</u>	<u>(1,996,414)</u>	(22.9%)

* This includes an adjustment for COLA in the January 1, 1995 valuation.

The development of the Expected Unfunded Actuarial Liability based on the January 1, 1995 valuation is displayed on Page 7. The difference between this amount and the actual Unfunded Actuarial Liability is known as the Actuarial Gain or Loss. For the period from January 1, 1995 to January 1, 1996, the Actuarial Gain was \$1,481,372,000. Lower than assumed increases in payroll and higher than expected returns on assets would account for the State and Teachers (other than Boston Teachers) gain. The higher than expected increase in payroll (8.5%) accounted for the loss for Boston Teachers.

SECTION II
SUMMARY DISCUSSION (Continued)

PART C Considerations for the Future

As discussed at the beginning of this section, the Commonwealth of Massachusetts must make payments in accordance with s. 22C of G.L. c. 32 for the Massachusetts Teachers' Contributory Retirement System, State Employees' Contributory Retirement System, Boston Teachers and for the cost-of-living allowances (COLA) granted to retirees and survivors of all local systems since the State assumed that liability.

In accordance with s. 22C, the Commonwealth must appropriate no less than the Cost of Benefits in each year through fiscal year 1998. The average annual increase in the Cost of Benefits over the first five years of the schedule was approximately 8% and there was a substantial increase (about 17%) in the Cost of Benefits in FY93 due to the State Early Retirement Incentive. Since the funding schedule may be expected to increase at a rate of approximately 4% per year, the Cost of Benefits would be expected to continue to be the required appropriation amount through FY98. The Cost of Benefits is projected to increase at a rate of about 5% per year for FY96 through FY98. A factor in future liabilities will be any statutory changes pertaining to benefit structure. It is impossible to anticipate such changes and thus estimate costs at this time.

PART D Other Information Available in this Report

As we stated in Part A of this section, the valuation results by type of benefit are on page 5. The development of the Actuarial Gain (Loss), as discussed in Part B, is on Page 6.

The actuarial information required under GASB Statement No. 5 is on Page 8. GASB Statements No. 25 and 27 are expected to be implemented for this valuation once the details have been determined by this office, in conjunction with the Comptroller's Office.

In addition, we have included a summary of asset information on Page 9. Assets are shown on a market value basis. For purposes of developing the Unfunded Actuarial Liability, we have used the market value of assets. In future years, an actuarial value of assets will be considered that would result in a five-year average of market values. This will serve to moderate the fluctuations that can occur if an unadjusted market value is used each year.

SECTION II
SUMMARY DISCUSSION (Continued)

PART D Other Information Available in this Report (continued)

On Pages 10 to 21, demographic information regarding the members of the State Employees' Retirement System, Massachusetts' Teachers' Retirement System, and Boston Teachers is presented. In conducting valuations PERA uses data provided by the retirement boards and works with those boards to improve the accuracy of that data. These charts display age, service and salary information for retirees and survivors. We have also included a description of the missing or invalid data and any assumptions which were made in consideration of such erroneous data.

A description of the funding method used in calculating valuation results is on Page 22, and the actuarial assumptions used are on Pages 23 to 25.

A brief summary of plan provisions appears on Pages 26 to 30.

Finally, a glossary of actuarial terminology is presented on Pages 31 to 32.

	State	State	Boston	Total
Total Normal Cost	\$236,931	\$236,703	\$26,872	\$499,506
Employee Contributions	272,642	191,719	18,324	482,685
Net Employer Normal Cost	\$177,101	\$399,984	\$8,548	\$685,633

D. Actuarial Liability (See Footnote)

	State	State	Boston	Total
I. Actives				
a. Superannuated	\$3,833,346	\$3,352,155	\$438,810	\$7,624,311
b. Terminated	80,705	(593)	3,618	83,730
c. Disabled	495,207	284,485	34,431	814,123
d. Other	226,283	519,523	36,420	782,226
Total Actives	\$4,535,541	\$3,855,570	\$513,279	\$8,904,390
II. Former Employees				
a. Terminated Members	196,264	233,315	145,466	575,045
b. Non-Contributing Members	52,254	49,664	6,739	108,657
Total Former Employees	\$248,518	\$282,979	\$152,205	\$683,702
Total Actuarial Liability	\$4,784,059	\$4,138,549	\$665,484	\$9,588,092
Unfunded Liability	\$2,366,080	\$2,532,530	\$48,682	\$4,947,292
Unfunded Liability as % of Total Liability	49.46%	61.22%	7.31%	51.61%

The liability attributable to the State Employees' Retirement System is based on the liability attributable to the State Employees' Retirement System. The liability attributable to the State Teachers' Retirement System is based on the liability attributable to the State Teachers' Retirement System. The liability attributable to the Boston Teachers' Retirement System is based on the liability attributable to the Boston Teachers' Retirement System. The liability attributable to the Commonwealth's Retirement Incentive Liability is based on the liability attributable to the Commonwealth's Retirement Incentive Liability.

SECTION II
SUMMARY DISCUSSION (Continued)

PART D Other Information Available in this Report (continued)

On Page 10 to 11, demographic information regarding the members of the State Employees' Retirement System, Massachusetts Teachers' Retirement System, and Boston Teachers is presented. In conducting valuation PERA case data provided by the retirement boards and works with those boards to improve the accuracy of that data. These charts display age, service and salary information for retirees and survivors. We have also included a description of the missing or invalid data and any assumptions which were made in consideration of such erroneous data.

A description of the funding method used in calculating valuation results is on Page 22, and the actuarial assumptions used are on Pages 23 to 25.

A brief summary of plan provisions appears on Pages 26 to 30.

Finally, a summary of actuarial terminology is presented on Pages 31 to 32.

SECTION III
SUMMARY OF VALUATION RESULTS

A. Number of Members on Current Valuation Date	State Employees	State Teachers	Boston Teachers	Local COLA*	Total
1. Active Members	83,198	68,864	6,313	n/a	
2. Vested Terminated Members	1,706	1,607	602	n/a	
3. Retired Members and Survivors	<u>42,443</u>	<u>28,831</u>	<u>2,257</u>	n/a	
Total	<u>127,347</u>	<u>99,302</u>	<u>9,172</u>	n/a	
B. Total Active Payroll **(000's omitted)	\$2,925,646	\$2,748,822	\$250,373		
C. Normal Cost (000's omitted)					
1. Superannuation	\$214,680	\$197,528	\$16,511		
2. Termination	24,713	21,564	2,122		
3. Disability	73,544	29,717	5,487		
4. Death	<u>44,014</u>	<u>37,894</u>	<u>2,752</u>		
Total Normal Cost	\$356,951	\$286,703	\$26,872	\$45,573	\$716,099
Employee Contribution	<u>229,849</u>	<u>191,719</u>	<u>18,324</u>	0	<u>439,892</u>
Net Employer Normal Cost	<u>\$127,102</u>	<u>\$94,984</u>	<u>\$8,548</u>	<u>\$45,573</u>	<u>\$276,207</u>
D. Actuarial Liability (000's omitted)					
1. Active					
a. Superannuation	\$3,955,540	\$5,352,155	\$438,830		
b. Termination	60,709	(593)	3,818		
c. Disability	495,207	284,485	54,431		
d. Death	<u>396,243</u>	<u>519,523</u>	<u>36,420</u>		
Total Actives	\$4,907,699	\$6,155,570	\$533,499	\$477,803	\$12,074,571
Vested Terminated Members	196,264	235,315	145,466	16,487	593,532
Non-Vested Terminated Members	52,254	49,664	6,739	0	108,657
Retirees and Survivors ***	<u>4,285,307</u>	<u>\$3,811,217</u>	<u>339,637</u>	<u>976,134</u>	<u>9,412,295</u>
Total Actuarial Liability	\$9,441,524	\$10,251,766	\$1,025,341	\$1,470,424	\$22,189,055
Assets (Market Value)	<u>7,366,060</u>	<u>7,552,530</u>	<u>548,649</u>	0	<u>15,467,239</u>
Unfunded Actuarial Liability	<u>\$2,075,464</u>	<u>\$2,699,236</u>	<u>\$476,692</u>	<u>\$1,470,424</u>	<u>\$6,721,816</u>
Funded Ratio (Ratio of Assets to Actuarial Liability)	78.0%	73.7%	53.5%	0.0%	69.7%

* This represents the liability attributable to local employees. The liability attributable to COLA for State, Teachers, and Boston Teachers is calculated as part of the overall liability associated with those components.

** Includes members with assumed values.

*** For Teachers this is adjusted by the Early Retirement Incentive liability to be paid by local school districts.

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/96

SECTION IV
DEVELOPMENT OF THE ACTUARIAL GAIN OR LOSS
 (\$000's omitted)

A. Development of Expected Unfunded Actuarial Liability

	State	Teachers	Boston Teachers	Local COLA	Total
1. Unfunded Actuarial Liability, 1/1/95	2,723,185	3,698,050	395,615	1,410,358	8,227,208
2. Normal cost, 1/1/95	113,265	91,449	8,264	45,846	258,824
3. Interest on 1. and 2. at 8 1/2% per year	241,098	322,107	34,330	123,777	721,313
4. Appropriation paid during 1995	436,078	391,057	34,817	101,268	963,220
5. Interest on 4. (assume mid-year payment)	<u>18,533</u>	<u>16,620</u>	<u>1,480</u>	<u>4,304</u>	<u>40,937</u>
6. Expected Unfunded Actuarial Liability, 1/1/96 [1.+2.+3.-4.-5.]	2,622,937	3,703,929	401,912	1,474,409	8,203,188
 B. Actual U.A.L. 1/1/96	 2,075,464	 2,699,236	 476,692	 1,470,424	 6,721,816
C. Total Gain (Loss) [A.6. - B.]	547,473	1,004,693	(74,780)	3,985	1,481,372

УЧЕБНО-МЕТОДИЧЕСКИЕ ЗАДАНИЯ
 (к курсу лекций по теме "Элементы теории групп")

Учебные задания составлены на основе лекций профессора А. А. Костомарова

№ п/п	Тема	Литература	Содержание	Сроки	Формы контроля
1	Группы	1. Б. А. Костомаров, "Элементы теории групп", М.: МФТИ, 1988 г.	Определение группы, свойства групп, подгруппы, нормальные подгруппы, факторгруппы, гомоморфизмы групп, изоморфизмы групп, автоморфизмы групп, группы перестановок, группы симметрии, группы Ли.	1-2 семестры	экзамен, курсовые работы
2	Симметрические группы	1. Б. А. Костомаров, "Элементы теории групп", М.: МФТИ, 1988 г.	Симметрическая группа, подгруппы симметрической группы, группа перестановок, группа симметрии, группа Ли.	1-2 семестры	экзамен, курсовые работы
3	Группы Ли	1. Б. А. Костомаров, "Элементы теории групп", М.: МФТИ, 1988 г.	Определение группы Ли, свойства групп Ли, подгруппы групп Ли, нормальные подгруппы групп Ли, факторгруппы групп Ли, гомоморфизмы групп Ли, изоморфизмы групп Ли, автоморфизмы групп Ли.	1-2 семестры	экзамен, курсовые работы
4	Группы Галуа	1. Б. А. Костомаров, "Элементы теории групп", М.: МФТИ, 1988 г.	Определение группы Галуа, свойства групп Галуа, подгруппы групп Галуа, нормальные подгруппы групп Галуа, факторгруппы групп Галуа, гомоморфизмы групп Галуа, изоморфизмы групп Галуа, автоморфизмы групп Галуа.	1-2 семестры	экзамен, курсовые работы

SECTION V
INFORMATION REQUIRED BY AUDITORS

INFORMATION REQUIRED BY AUDITORS (Cont'd)

In November of 1994, GASB issued Statements No. 25, 26 and 27, relating to Financial Reporting and Accounting for Pension Plans. We have included in this report the actuarial information required by Statement No. 27. The Statement must be implemented no later than Fiscal Year 1997, but early implementation was encouraged by GASB. The Commonwealth of Massachusetts has chosen to implement Statement No. 27 for the reporting year Fiscal 1996.

For purposes of comparison, we have also shown the amounts which would have been included if the previous rules under GASB Statement No. 5 and APB Opinion No. 8 were still in effect. The actuarial method which was used to determine the amounts under these rules was the Projected Unit Credit Cost Method, with salary increases. This method allocates an amount of benefit to each year of service, which is unlike the Entry Age Normal Cost Method, used in the valuation and for purposes of determining funding requirements, which allocates a cost as a percent of salary to each year of service.

Under GASB Statement No. 27, the calculation of an Annual Required Contribution (ARC) is required for each year. This calculation is to be based upon the same methods and assumptions as are applied in determining funding requirements, but with certain limiting parameters within which these methods and assumptions must fall. At this time, the methods and assumptions used by the Commonwealth to determine the funding schedule are well within the parameters established by Statement No. 27.

In order to calculate the ARC in the first year for which Statement No. 27 is in effect, a Net Pension Obligation (NPO) at transition must be calculated. This is essentially the cumulative difference between the employer's required contributions and the contributions actually made by the employer for all years beginning with Fiscal Year 1988. The employer's required contribution is the same as the ARC, except that the minimum parameters do not apply.

Note that, in any year, the amount of the ARC will probably not equal the Commonwealth's appropriation amounts because of the following:

1. The ARC is based upon the most recent valuation, whereas the funding schedule is submitted to the legislature 15 months after the valuation upon which it is based. The funding schedule is then set for the upcoming three fiscal years.

SECTION
INFORMATION SUPPLEMENTARY STATEMENTS

In November of 1994, GASB issued Statement No. 25, 26 and 27, relating to Financial Reporting and Accounting for Pension Plans. We have included in this report the actuarial information required by Statement No. 27. The Statement must be implemented no later than Fiscal Year 1997, but early implementation was encouraged by GASB. The Comptroller's Office of Management has chosen to implement Statement No. 27 for the reporting year Fiscal 1996.

For purposes of comparison, we have also shown the amounts which would have been included in the previous rates under GASB Statement No. 2 and APB Opinion No. 8 were still in effect. The actuarial method which was used to determine the amounts under these rates was the Projected Unit Credit Cost Method, with salary increases. This method allocates an amount of benefit to each year of service, which is under the Early Actuarial Cost Method, used in the valuation and for purposes of determining funding requirements, which allocates a cost as a percent of salary to each year of service.

Under GASB Statement No. 27, the calculation of an Annual Required Contribution (ARC) is required for each year. This calculation is to be based upon the same methods and assumptions as are applied in determining funding requirements, but with certain funding parameters which these methods and assumptions must fall. At this time, the methods and assumptions used by the Comptroller's Office to determine the funding schedule are all within the parameters established by Statement No. 27.

In order to calculate the ARC in the first year for which Statement No. 27 is in effect, a Net Pension Obligation (NPO) at transition must be calculated. This is essentially the cumulative difference between the employer's required contributions and the employer's actuals made by the employer for all years beginning with Fiscal Year 1988. The employer's required contribution is the same as the ARC, except that the minimum parameters do not apply.

Note that in any year, the amount of the ARC will probably not equal the Comptroller's contribution amount because of the following:

1. The ARC is based upon the most recent valuation, whereas the funding schedule is submitted to the legislature 12 months after the valuation upon which it is based. The funding schedule is then set for the upcoming three fiscal years.

SECTION V
INFORMATION REQUIRED BY AUDITORS- (Cont'd)

2. The Commonwealth is actually paying the Cost of Benefits through Fiscal Year 1998. This amount has always been larger than the amount called for by the funding schedule. Obviously, this will not be a factor after Fiscal Year 1998.
3. Although there is no difference in the totals, contributions have been allocated slightly differently among the State, Teachers and COLA portions. For purposes of Statement No. 27, a larger contribution was made to COLA, with lesser amounts to State and Teachers. No change was made to Boston Teachers. This was done to avoid the nonsensical result in the financial statements of having the COLA underfunded, even though the system in total is overfunded and the budget is done in total. This adjustment will not be made when it is no longer necessary.

Below are the amounts under GASB Statement No. 5. On the following page is the information that was formerly required by the auditors under APB Opinion No. 8. Next is the development of the ARC and the under (over) funded status for Fiscal Year 1996, followed by the calculation of the NPO at transition. In future years, only the development of the ARC and the under (over) funded status will be included in the valuation report.

A. GASB STATEMENT NO. 5 ACTUARIAL INFORMATION (\$000 omitted)

Projected Benefit Obligation as of 1/1/96 attributable to:	<u>STATE</u>	<u>TEACHERS</u>	<u>BOSTON TEACHERS</u>	<u>COLA</u>	<u>TOTAL</u>
1. Retirees and beneficiaries currently receiving benefits*	\$4,285,307	\$3,811,217	\$339,637	\$976,134	\$9,412,295
2. Terminated employees who have not yet received benefits or a return of contributions (inactives)	248,518	284,980	152,205	16,487	702,190
3. Current employees (active members)					
a. Accumulated employee contributions with interest	2,113,246	2,348,874	205,399	0	4,667,519
b. Vested benefits financed by the Commonwealth	1,864,715	2,965,396	246,669	448,612	5,525,392
c. Non-vested benefits financed by the Commonwealth	562,261	311,364	34,398	86,844	994,867
Total Pension Benefit Obligation	\$9,074,047	\$9,721,831	\$978,308	\$1,528,077	\$21,302,263
Assets at Market Value	7,366,060	7,552,530	548,649	0	15,467,239
Unfunded Pension Benefit Obligation	\$1,707,987	\$2,169,301	\$429,659	\$1,528,077	\$5,835,024

*For Teachers, this is adjusted by the Early Retirement Incentive liability to be paid by local school districts.

SECTION V
 INFORMATION PROVIDED BY AUDITORS (Cont'd)

2. The Commonwealth is actually paying the Cost of Benefits through Fiscal Year 1998. This amount has always been larger than the amount called for by the funding schedule. Conversely, this will not be a factor after Fiscal Year 1998.
3. Although there is no difference in the total contributions have been allocated slightly differently among the State, Teachers and COLA portions. For purposes of Statement No. 24 a larger contribution was made to COLA with lesser amounts to State and Teachers. No change was made to Boston Teachers. This was done to avoid the nonrecognition result in the financial statements of having the COLA underfunded, even though the system in total is over-funded and the budget is done in total. This adjustment will not be made when it is no longer necessary.

Below are the amounts under GASB Statement No. 5. On the following page is the information that was formerly reported by the auditors under APB Opinion No. 3. That is the development of the ARC and the under (over) funded status for fiscal year 1998 followed by the calculation of the NMO in transition. In future years only the development of the ARC and the under (over) funded status will be included in the valuation report.

A. GASB STATEMENT NO. 5 ACTUARIAL INFORMATION (2000 dollars)

LOCAL PENSION OBLIGATIONS AS OF 12/31	STATE	TEACHERS	COLA	TOTAL
1. Actuarial employees contributions	24,187,107	24,811,317	239,503	49,237,927
2. Actuarial employees contributions (over) funded	241,312	234,980	123,202	499,494
3. Actuarial employees contributions (under) funded	5,117,246	2,148,274	202,700	7,468,220
4. Actuarial employees contributions (over) funded by the Commonwealth	1,864,772	2,962,986	242,800	4,850,558
5. Actuarial employees contributions (under) funded by the Commonwealth	63,201	311,361	14,302	388,864
6. Actuarial employees contributions (over) funded by the Commonwealth	20,041,917	24,701,471	207,308	44,950,696
7. Actuarial employees contributions (under) funded by the Commonwealth	12,600,001	2,222,220	244,802	15,067,023
8. Actuarial employees contributions (over) funded by the Commonwealth	21,207,962	22,479,251	247,610	43,934,823

The figures are in dollars for the year ending December 31, 1998, as of local school districts.

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/96

SECTION V
B. INFORMATION UNDER OPINION No. 8 (\$000 omitted)

	State	Teachers	Boston Teachers	COLA	Total
FY89 Unpaid Pension Liability	\$170,661	\$234,881	\$21,288	\$129,016	\$555,846
FY90 Unpaid Pension Liability	+ 174,892	+ 237,555	+ 21,868	+ 155,710	+ 590,025
FY91 Unpaid Pension Liability	+ 233,645	+ 312,631	+ 20,523	+ 166,869	+ 733,668
FY92 Unpaid Pension Liability	+ 35,188	+ 98,941	+ 19,437	+ 95,249	+ 248,815
FY93 Unpaid Pension Liability	+ 48,895	+ 79,348	+ 8,376	+ 97,283	+ 233,902
FY94 Unpaid Pension Liability	+ 51,944	+ 25,335	+ 1,787	+ 118,111	+ 197,177
FY95 Unpaid Pension Liability	+ (113,054)	+ (21,411)	+ 5,148	+ 62,785	+ (66,532)
Total Unpaid Pension Liability (FY89 through FY95)	\$602,171	\$967,280	\$98,427	\$825,023	\$2,492,901
Normal Cost, 7/1/95	\$413,972	\$355,973	\$33,442	\$47,590	\$850,977
Amortization of 7/1/88					
Unfunded Actuarial Liability	+ 245,743	+ 346,738	+ 30,505	+ 167,878	+ 790,864
Amortization of FY89 loss (gain)	+ (17,916)	+ (15,712)	+ (1,759)	+ 0	+ (35,386)
Amortization of FY90 loss (gain)	+ 5,790	+ (2,547)	+ 501	+ (9,936)	+ (6,192)
Amortization of FY91 loss (gain)	+ (151,004)	+ (161,735)	+ (9,420)	+ (79,153)	+ (401,313)
Amortization of FY92 loss (gain)	+ 84,805	+ (24,782)	+ (4,717)	+ 17,210	+ 72,516
Amortization of FY93 loss (gain)	+ 2,063	+ (29,523)	+ (5,065)	+ 7,182	+ (25,341)
Amortization of FY94 assump. chg.	+ (79,007)	+ (49,276)	+ (3,897)	+ (42,732)	+ (174,911)
Amortization of FY94 loss (gain)	+ (64,215)	+ 21,069	+ 6,740	+ (20,156)	+ (56,562)
Amortization of FY95 loss (gain)	+ 75,062	+ 116,764	+ (3,896)	+ 3,537	+ 191,466
Total Pension Expense, 7/1/95	\$504,445	\$419,136	\$39,591	\$108,039	\$1,071,212
Interest to 6/30/96	+ 42,878	+ 35,627	+ 3,365	+ 9,183	+ 91,053
Interest on Unpaid Pension Liab.	+ 51,185	+ 82,219	+ 8,366	+ 70,127	+ 211,897
Total Pension Expense, 6/30/96	\$598,508	\$536,982	\$51,323	\$187,349	\$1,374,161
Actual FY96 Contributions (includes Employee Contributions)	- 671,236	- 596,853	- 51,257	- 103,678	- 1,423,024
FY96 Unpaid Pension Liability	(\$72,728)	(\$59,871)	\$66	\$83,671	(\$48,863)
Total Unpaid Pension Liability (FY89 through FY96)	\$529,443	\$907,409	\$98,493	\$908,694	\$2,444,038

* Note: Opinion #8 requires the development of a funding schedule according to the level dollar amortization method. The funding schedule established pursuant to c. 32, s. 22C is based on the increasing amortization payment method. This explains the existence of an unpaid pension liability under Opinion #8.

SECTION 2
 INFORMATION UNDER SECTION 408 (continued)

Year	1998	1997	1996	1995	1994
Total Pension Liability (Y98 through Y98)	\$2,144,074	\$2,084,004	\$2,074,000	\$2,074,000	\$2,074,000
Total Unpaid Pension Liability (Y98 through Y98)	\$2,144,074	\$2,084,004	\$2,074,000	\$2,074,000	\$2,074,000
Y98 Unpaid Pension Liability	\$2,144,074	\$2,084,004	\$2,074,000	\$2,074,000	\$2,074,000
Y97 Unpaid Pension Liability					
Y96 Unpaid Pension Liability					
Y95 Unpaid Pension Liability					
Y94 Unpaid Pension Liability					
Y93 Unpaid Pension Liability					
Y92 Unpaid Pension Liability					
Y91 Unpaid Pension Liability					
Y90 Unpaid Pension Liability					
Y89 through Y98					
Total Pension Expense, 1998	\$2,144,074	\$2,084,004	\$2,074,000	\$2,074,000	\$2,074,000
Total Pension Expense, 1997					
Total Pension Expense, 1996					
Total Pension Expense, 1995					
Total Pension Expense, 1994					
Total Pension Expense, 1993					
Total Pension Expense, 1992					
Total Pension Expense, 1991					
Total Pension Expense, 1990					
Total Pension Expense, 1989 through 1998					
Y98 through Y98					
Y97 through Y97					
Y96 through Y96					
Y95 through Y95					
Y94 through Y94					
Y93 through Y93					
Y92 through Y92					
Y91 through Y91					
Y90 through Y90					
Y89 through Y89					

* Note: Company's actuals are based on the development of a liability schedule according to the level contribution method. The liability schedule attached pursuant to 408(a)(2)(C) is based on the level contribution method. This explains the variance of an unpaid pension liability under Section 408.

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/96

SECTION V

C. INFORMATION REQUIRED BY AUDITORS UNDER GASB STATEMENT NO. 27 (\$000's omitted)

	STATE	TEACHERS	BOSTON TEACHERS	COLA	TOTAL
1. Annual Required Contribution for FY1996:					
a. Normal Cost	\$125,675	\$93,918	\$8,452	\$45,061	\$273,106
b. Amortization Cost	<u>106,483</u>	<u>138,486</u>	<u>24,457</u>	<u>75,441</u>	<u>344,866</u>
c. ARC	\$232,158	\$232,403	\$32,909	\$120,502	\$617,973
2. Amount under (over) funded from prior year	(\$551,973)	(\$356,601)	(\$21,887)	\$0	(\$930,461)
a. Interest on under (over) funding	(\$46,918)	(\$30,311)	(\$1,860)	\$0	(\$79,089)
b. Amortization of under (over) funding	<u>(29,523)</u>	<u>(19,073)</u>	<u>(1,171)</u>	<u>0</u>	<u>(49,767)</u>
3. Total Pension Cost (1.c. + 2.a. - 2.b.)	\$214,763	\$221,165	\$32,219	\$120,502	\$588,650
4. Actual Contribution	<u>433,114</u>	<u>392,003</u>	<u>34,822</u>	<u>120,502</u>	<u>980,441</u>
5. FY1996 Payment under (over) (3. - 4.)	(\$218,351)	(\$170,838)	(\$2,603)	\$0	(\$391,791)
6. Adjusted under (over) funding (2. + 5.)	<u>(\$770,324)</u>	<u>(\$527,438)</u>	<u>(\$24,490)</u>	<u>\$0</u>	<u>(\$1,322,253)</u>

q	Volume of water (m ³)	Impurity (S + Z)	(2,507,194)	(2,233,978)	(2,274,005)	70	(2,133,333)
r	Volume of water (m ³)	Impurity (Z + P)	(2,518,791)	(2,133,978)	(2,570,474)	70	(2,201,101)
f	Volume of water (m ³)	Impurity (S + Z + P)	593,114	333,607	1,177,975	100,000	1,100,000
g	Volume of water (m ³)	Impurity (Z + P)	251,109	233,112	233,112	100,000	233,112
p	Volume of water (m ³)	Impurity (S + Z + P)	(333,333)	(76,007)	(71,107)	0	(70,000)
r	Volume of water (m ³)	Impurity (S + Z)	(1,905,118)	(420,311)	(3,180)	20	(2,325,000)
s	Volume of water (m ³)	Impurity (S + Z + P)	(2,221,101)	(2,221,101)	(2,211,101)	30	(2,200,000)
e	MBC		2,233,128	2,133,100	2,274,000	100,000	2,133,100
f	Volume of water (m ³)		100,000	1,100,000	1,100,000	100,000	1,100,000
g	Volume of water (m ³)		443,267	203,514	203,514	100,000	443,267
	Volume of water (m ³)		STATE	TEVCHER	TEVCHER	STATE	STATE

STATE OF CALIFORNIA
 DEPARTMENT OF WATER RESOURCES
 DIVISION OF WATER RIGHTS
 WATER RIGHTS STATEMENT
 FOR THE YEAR 1980

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/96

From January 1, 1982 valuation:

SECTION V

D. Calculation of the "Net Pension Obligation" ("NPO") under GASB Statement Number 27

(\$000 omitted)

	STATE	TEACHERS	BOST. TCHRS.	COLA	TOTAL
From January 1, 1987 valuation:					
FY88 (yr. 1):					
Normal Cost	157,390	108,246	9,836	35,756	311,227
Amortiz. Cost	122,192	124,415	10,479	35,100	292,186
ARC	279,582	232,661	20,315	70,856	603,414
Actual Contr.	252,585	252,597	21,905	73,113	600,200
under (over) funding	26,997	(19,936)	(1,590)	(2,257)	3,214

FY89 (yr. 2):

First funding schedule implemented; 40 yr., 7 1/2% increasing amortization payments

Normal Cost	166,833	114,741	10,426	37,901	329,901
Amortiz. Cost	131,967	134,368	11,317	37,908	315,561
ARC	298,801	249,109	21,744	75,809	645,462
int. on under (over) fund.	2,160	(1,595)	(127)	(181)	257
amort. of under (over)	977	(722)	(58)	(82)	116
Pension Cost	299,983	248,235	21,674	75,710	645,603
Actual Contr.	269,866	246,531	23,225	97,700	637,322
Payment less (more)	30,117	1,704	(1,551)	(21,990)	8,281
Adj. under (over) funding	57,114	(18,232)	(3,140)	(24,247)	11,495

From January 1, 1990 valuation:

FY90 (yr. 3):

Normal Cost	165,176	87,698	9,299	47,609	309,783
Amortiz. Cost	93,925	139,571	11,820	55,442	300,758
ARC	259,102	227,269	21,119	103,051	610,541
int. on under (over) fund.	4,569	(1,459)	(251)	(1,940)	920
amort. of under (over)	2,103	(671)	(116)	(893)	423
Pension Cost	261,568	226,482	20,983	102,004	611,037
Actual Contr.	289,500	251,400	23,000	82,600	646,500
Payment less (more)	(27,932)	(24,918)	(2,017)	19,404	(35,463)
Adj. under (over) funding	29,182	(43,150)	(5,158)	(4,842)	(23,968)

FY91 (yr. 4):

Normal Cost	178,655	94,854	10,058	51,494	335,061
Amortiz. Cost	104,027	154,582	13,091	61,405	333,105
ARC	282,682	249,436	23,149	112,899	668,166
int. on under (over) fund.	2,335	(3,452)	(413)	(387)	(1,917)
amort. of under (over)	1,094	(1,617)	(193)	(181)	(898)
Pension Cost	283,923	247,602	22,929	112,693	667,147
Actual Contr.	311,400	266,900	25,700	77,900	681,900
Payment less (more)	(27,477)	(19,298)	(2,771)	34,793	(14,753)
Adj. under (over) funding	1,705	(62,449)	(7,928)	29,951	(38,721)

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/96

From January 1, 1992 valuation:

FY92 (yr. 5):	2nd funding schedule implemented; 37 yr., 7 1/2% increasing amortization payments				
Normal Cost	177,083	109,150	14,404	46,115	346,752
Amortiz. Cost	75,603	113,891	12,127	44,767	246,388
ARC	252,687	223,041	26,530	90,882	593,140
int. on under (over) fund.	136	(4,996)	(634)	2,396	(3,098)
amort. of under (over)	65	(2,384)	(303)	1,143	(1,478)
Pension Cost	252,758	220,429	26,199	92,135	591,521
Actual Contr.	323,700	282,300	26,400	97,000	729,400
Payment less (more)	(70,942)	(61,871)	(201)	(4,865)	(137,879)
Adj. under (over) funding	(69,237)	(124,320)	(8,130)	25,086	(176,601)

From January 1, 1993 valuation:

FY93 (yr. 6):					
Normal Cost	134,409	113,332	9,369	48,265	305,375
Amortiz. Cost	109,178	112,505	11,094	54,571	287,349
ARC	243,587	225,837	20,463	102,836	592,724
int. on under (over) fund.	(5,539)	(9,946)	(650)	2,007	(14,128)
amort. of under (over)	(2,694)	(4,837)	(316)	976	(6,871)
Pension Cost	240,742	220,729	20,129	103,867	585,467
Actual Contr.	402,100	296,100	27,200	119,700	845,100
Payment less (more)	(161,358)	(75,371)	(7,071)	(15,833)	(259,633)
Adj. under (over) funding	(230,595)	(199,691)	(15,201)	9,253	(436,234)

FY94 (yr. 7):

Normal Cost	145,377	122,580	10,134	52,204	330,294
Amortiz. Cost	121,188	124,880	12,314	60,574	318,956
ARC	266,564	247,460	22,448	112,777	649,250
int. on under (over) fund.	(18,448)	(15,975)	(1,216)	740	(34,899)
amort. of under (over)	(9,152)	(7,925)	(603)	367	(17,313)
Pension Cost	257,268	239,410	21,835	113,150	631,664
Actual Contr.	398,900	322,100	28,000	117,000	866,000
Payment less (more)	(141,632)	(82,690)	(6,165)	(3,850)	(234,336)
Adj. under (over) funding	(372,227)	(282,381)	(21,365)	5,404	(670,569)

From January 1, 1995 valuation:

FY95 (yr. 8):	3rd funding schedule implemented; equivalent to 34 yr., 2 1/2% incr. amort. pymts.				
Normal Cost	111,993	90,421	8,171	45,331	255,917
Amortiz. Cost	137,646	186,922	19,997	71,288	415,854
ARC	249,640	277,344	28,168	116,619	671,771
int. on under (over) fund.	(31,639)	(24,002)	(1,816)	459	(56,998)
amort. of under (over)	(19,614)	(14,880)	(1,126)	285	(35,335)
Pension Cost	237,615	268,221	27,478	116,794	650,108
Actual Contr.	417,361	342,441	28,000	122,198	910,000
Payment less (more)	(179,746)	(74,220)	(522)	(5,404)	(259,892)
Adj. under (over) funding	(551,973)	(356,601)	(21,887)	(0)	(930,461)

Company's Total Financial Obligations Available - 1/1/02

From January 1, 1992 valuation				From January 1, 1992 valuation				From January 1, 1992 valuation			
FY02 (a) (b)				FY02 (a) (b)				FY02 (a) (b)			
Home Cost	177,000	14,000	163,000	Home Cost	174,000	9,000	165,000	Home Cost	142,000	10,000	132,000
Aviation Cost	70,000	12,000	58,000	Aviation Cost	107,000	11,000	96,000	Aviation Cost	121,000	12,000	109,000
ARC	202,000	20,000	182,000	ARC	211,000	20,000	191,000	ARC	202,000	20,000	182,000
in an order (over) fund	100	(4,000)	(3,900)	in an order (over) fund	(2,000)	(8,000)	(10,000)	in an order (over) fund	(10,000)	(1,000)	(11,000)
short of order (over)	300,000	20,000	280,000	short of order (over)	1,000	(1,000)	0	short of order (over)	100,000	20,000	80,000
Actual Cost	300,000	20,000	280,000	Actual Cost	401,000	20,000	381,000	Actual Cost	400,000	20,000	380,000
Payment (over) (under)	(10,000)	(1,000)	(11,000)	Payment (over) (under)	(10,000)	(1,000)	(11,000)	Payment (over) (under)	(10,000)	(1,000)	(11,000)
Ad. order (over) funding	(24,000)	(8,000)	(32,000)	Ad. order (over) funding	(20,000)	(10,000)	(30,000)	Ad. order (over) funding	(20,000)	0	(20,000)
From January 1, 1992 valuation				From January 1, 1992 valuation				From January 1, 1992 valuation			
FY02 (a) (b)				FY02 (a) (b)				FY02 (a) (b)			
Home Cost	177,000	14,000	163,000	Home Cost	174,000	9,000	165,000	Home Cost	142,000	10,000	132,000
Aviation Cost	70,000	12,000	58,000	Aviation Cost	107,000	11,000	96,000	Aviation Cost	121,000	12,000	109,000
ARC	202,000	20,000	182,000	ARC	211,000	20,000	191,000	ARC	202,000	20,000	182,000
in an order (over) fund	100	(4,000)	(3,900)	in an order (over) fund	(2,000)	(8,000)	(10,000)	in an order (over) fund	(10,000)	(1,000)	(11,000)
short of order (over)	300,000	20,000	280,000	short of order (over)	1,000	(1,000)	0	short of order (over)	100,000	20,000	80,000
Actual Cost	300,000	20,000	280,000	Actual Cost	401,000	20,000	381,000	Actual Cost	400,000	20,000	380,000
Payment (over) (under)	(10,000)	(1,000)	(11,000)	Payment (over) (under)	(10,000)	(1,000)	(11,000)	Payment (over) (under)	(10,000)	(1,000)	(11,000)
Ad. order (over) funding	(24,000)	(8,000)	(32,000)	Ad. order (over) funding	(20,000)	(10,000)	(30,000)	Ad. order (over) funding	(20,000)	0	(20,000)

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/96

SECTION VI
ASSETS

From January 1, 1996 valuation:

FY96 (yr. 9):

Normal Cost	125,675	93,918	8,452	45,061	273,106
Amortiz. Cost	106,483	138,486	24,457	75,441	344,866
ARC	232,158	232,403	32,909	120,502	617,973
int. on under (over) fund.	(46,918)	(30,311)	(1,860)	(0)	(79,089)
amort. of under (over)	(29,523)	(19,073)	(1,171)	(0)	(49,767)
Pension Cost	214,763	221,165	32,219	120,502	588,650
Actual Contr.	433,114	392,003	34,822	120,502	980,441
Payment less (more)	(218,351)	(170,838)	(2,603)	0	(391,791)
Adj. under (over) funding	(770,324)	(527,438)	(24,490)	(0)	(1,322,253)
Investment in the Pension Reserve			3,311,363	3,050,831	
Investment Trust (market value)					
TOTAL			\$7,366,060	\$7,552,530	

B. Breakdown of Assets by Fund

Annuity Savings Fund	\$2,211,422
Annuity Reserve Fund	625,767
Military Service Fund	108
All Other Funds	4,518,763
Total	\$7,366,060

C. Assets for Boston Teachers

For Boston Teachers, we assumed that the portion of total assets to be allocated is the same proportion as shown in the January 1, 1994 actuarial valuation report for the City of Boston, performed by PERA.

	1/01/95	1/01/96
Total City of Boston assets (Market Value)	\$1,463,377	\$1,834,181
Assets allocated to Boston Teachers	\$437,732	\$548,649

* This information is normally included in the Annual Statement which must be submitted to PERA by May 15 of each year. However, the Teachers' Retirement System has been unable to complete this statement as of 12/31/95.

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/96

SECTION VI
INFORMATIONAL MEMBERSHIP
SECTION VI
ASSETS

(000's omitted)

A. Breakdown of Assets

	STATE	TEACHERS
Investment in the Treasurer's Masters Trust (market value)	\$4,043,837	\$4,494,968
Investment in Massachusetts Technical Development Corp.	860	724
Investment in the Pension Reserve Investment Trust (market value)	3,321,363	3,056,838
TOTAL	<u>\$7,366,060</u>	<u>\$7,552,530</u>

B. Breakdown of Assets by Fund

Annuity Savings Fund	\$2,221,422	
Annuity Reserve Fund	625,767	
Military Service Fund	108	*
All Other Funds	4,518,763	
Total	<u>\$7,366,060</u>	<u>\$7,552,530</u>

C. Assets for Boston Teachers

For Boston Teachers, we assumed that the portion of total assets to be allocated is the same proportion as shown in the January 1, 1994 actuarial valuation report for the City of Boston, performed by PERA.

Present Age	Years of Service					1/01/95	25-29	1/01/96	Total
	0-4	5-9	10-14	15-19	20-24				
Total City of Boston assets (Market Value)						\$1,463,377		\$1,834,181	1,679
Assets allocated to Boston Teachers						\$437,732		\$548,649	6,540
	10-34	3,629	4,256	2,360	219				10,464
	45-49	1,396	2,705	2,921	2,998	2,366	1,018	35	13,819
	50-54	1,170	1,911	2,182	2,011	1,816	1,437	299	10,483
	55-59	651	1,183	1,420	1,418	868	956	527	7,021
	60-64	322	804	954	993	544	639	422	4,078
	65+	70	356	531	556	255	293	338	2,309
Total		19,028	20,491	17,316	13,513	6,486	4,435	1,621	83,195

* This information is normally included in the Annual Statement which must be submitted to PERA by May 15 of each year. However, the Teachers' Retirement System has been unable to complete this statement as of 12/31/95.

SECTION VI
ASSETS
(000's omitted)

A. Breakdown of Assets

TEACHERS	STATE	Investment in the Teacher's Mutual Trust (market value)
24,994,028	24,047,837	
134	800	Investment in Massachusetts Technical Development Corp.
3,026,838	1,331,363	Investment in the Pension Reserve Investment Trust (market value)
<u>27,121,290</u>	<u>25,380,000</u>	TOTAL

B. Breakdown of Assets by Fund

		Total
	22,321,423	Annuit Savings Fund
	62,787	Annuit Reserve Fund
	108	Military Service Fund
	4,218,702	All Other Funds
<u>27,222,710</u>	<u>27,203,920</u>	

C. Assets for Boston Teachers
For Boston Teachers, we assumed that the portion of total assets to be allocated is the same proportion as shown in the January 1, 1994 actuarial valuation report for the City of Boston performed by FBR.

Assets allocated to Boston Teachers	2437,732	Total City of Boston assets (Market Value)	21,834,181
	1,019,822		1,019,822

* This information is normally included in the Annual Statement which must be submitted to FBR by May 15 of each year. However, the Teachers' Retirement System has been unable to complete this statement as of 12/31/92.

SECTION VII
INFORMATION ON SYSTEM MEMBERSHIP

Part A - State Employees

A critical element of an actuarial valuation is accurate and up-to-date membership information which is provided by the retirement board. In recognition of this fact, PERA conducted an extensive review of existing data collection methods while also analyzing actual member information submitted as of 12/31/95 by the **State Board of Retirement**.

State Active Members

If not indicated in the record, we assumed employees are full time, two thirds of the members are married with the male spouse three years older, and married members have two children. Veteran status was not available in about 3% of the records. In those cases, we assumed that 85% of these members were not veterans and 15% were veterans.

	<u>Actives</u>	<u>Vested Terms</u>
Number of Members	83,198	1,706
Average Age	43.6	48.6
Average Service	10.8	14.8
Average Salary	\$35,165	\$37,112
Average Annuity Savings Fund Balance	\$25,400	\$32,476

Age by Service Distribution of Active Members

<i>Present Age</i>	Years of Service								Total
	<i>0 - 4</i>	<i>5 - 9</i>	<i>10 - 14</i>	<i>15 - 19</i>	<i>20 - 24</i>	<i>25 - 29</i>	<i>30 +</i>		
0-24	1,590	89							1,679
25-29	4,590	2,206	166						6,962
30-34	3,629	4,256	2,360	219					10,464
35-39	2,775	3,817	3,753	2,090	81				12,516
40-44	2,335	3,164	3,229	3,298	1,056	95			13,177
45-49	1,896	2,705	2,921	2,998	2,266	1,018	35		13,839
50-54	1,170	1,911	2,182	2,048	1,416	1,437	299		10,463
55-59	651	1,183	1,420	1,416	868	956	527		7,021
60-64	322	804	954	993	544	639	422		4,678
65 +	70	356	531	556	255	293	338		2,399
Total	19,028	20,491	17,516	13,618	6,486	4,438	1,621		83,198

SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP

Part A - State Employees

A critical element of an actuarial valuation is accurate and up-to-date membership information which is provided by the retirement board. In recognition of this fact, FRRA conducted an extensive review of existing data collection methods while also analyzing actual member information submitted as of 12/31/95 by the State Board of Retirement.

State Active Members

If not indicated in the record, we assumed spouses are full time, two-thirds of the members are married with the male spouse three years older, and married members have two children. Veterans status was not available in about 3% of the records. In those cases, we assumed that 50% of these members were not veterans and 50% were veterans.

Number of Members	Average Age	Average Service	Average Salary	Average Annuity Savings	Fund Balance
21,198	43.6	10.8	23,182		252,400
1,708	42.6	14.8	23,112		232,430

Age by Length of Service of Active Members

Total	Years of Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
1,679	89	1,590						1,679
6,963	1,500	2,506	166					6,963
10,464	3,659	4,256	2,160	219				10,464
13,816	1,772	3,812	3,733	2,000	81			13,816
13,777	2,332	3,164	3,259	2,298	1,000	92		13,777
17,839	1,866	2,702	2,021	2,998	2,266	1,018	32	17,839
10,463	1,150	1,911	2,182	2,048	1,416	1,932	289	10,463
7,021	621	1,182	1,420	1,416	868	426	227	7,021
4,424	322	804	924	992	244	839	423	4,424
2,269	20	250	221	226	222	209	102	2,269
27,118	10,028	20,191	17,816	17,042	6,480	1,428	1,621	27,118

SECTION VII
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

State Active Members (continued)Salary by Age Distribution of Active Members

<i>Present Age</i>	<i>Number of Participants</i>	<i>Total Salary</i>	<i>Average Salary</i>
0 - 24	1,679	\$34,348,366	\$20,458
25 - 29	6,962 2*	189,864,848 \$65,430	\$27,272 \$32,715
30 - 34	10,464 46*	328,173,311 1,505,945	\$31,362 \$32,738
35 - 39	12,516 178*	418,548,998 6,050,534	\$33,441 \$33,992
40 - 44	13,177 325*	474,202,179 12,525,518	\$35,987 \$38,540
45 - 49	13,839 395*	528,302,598 15,194,243	\$38,175 \$38,466
50 - 54	10,463 416*	403,181,287 16,109,120	\$38,534 \$38,724
55 - 59	7,021 198*	271,867,934 7,221,563	\$38,722 \$36,473
60 - 64	4,678 85*	181,826,236 2,827,483	\$38,868 \$33,265
65 +	2,399 61*	95,329,905 1,813,590	\$39,737 \$29,731
Total	83,198 1,706*	\$2,925,645,662 \$63,313,426	\$35,165 \$37,112

Actual Employee Contributions made during 1995: \$210,379,260

* Vested Terminated Members

SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Total Available Members (continued)

Salary by Age Distribution of Active Members

Age Group	Number of Members	Total Salary	Average Salary
0 - 24	1,879	\$34,748,506	\$18,493
25 - 29	4,007	189,864,848	47,383
30 - 34	10,464	358,173,318	34,218
35 - 39	12,516	418,968,998	33,476
40 - 44	13,177	474,202,179	35,989
45 - 49	13,839	528,902,998	38,229
50 - 54	10,893	402,181,287	36,928
55 - 59	7,051	271,267,944	38,471
60 - 64	4,878	181,828,296	37,275
65 +	2,709	97,329,992	35,928
Total	83,198	\$2,922,642,992	\$35,137

Annual Employee Contributions made during 1995: \$210,478,000

* Verified Termination Members

SECTION VII
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

State Retirees and Survivors

Retiree data had very few errors or missing information. In the few cases where assumptions were necessary, a best estimate was made based on the data available in that particular record.

	<i>Superannuation</i>	<i>Acc Dis</i>	<i>Ord Dis</i>	<i>Survivors</i>	Total
Number of	33,030	2,353	787	6,273	42,443
Average Age	72.2	63.0	67.2	72.0	71.6
Avg. Annual	\$12,745	\$17,853	\$11,409	\$6,959	\$12,148
Annuity	\$63,193,076	\$1,953,610	\$814,119	\$5,104,014	\$71,064,819
Pension from the State	335,811,666	39,820,521	7,849,592	37,148,554	420,630,333
Pension from other	<u>21,959,125</u>	<u>232,811</u>	<u>315,515</u>	<u>1,401,067</u>	<u>23,908,518</u>
TOTAL	\$420,963,867	\$42,006,942	\$8,979,226	\$43,653,635	\$515,603,670

LOT	2420'003'202	2417'000'047	28'000'530	241'423'032	2417'003'090
Area	51'028'172	377'271	377'272	7'300'003	57'008'213
Volume	112'811'000	30'870'231	1'000'003	21'148'224	450'830'773
Volume	207'187'030	21'023'010	2814'110	22'104'014	211'004'172
Area	215'142	211'823	211'400	20'020	215'149
Volume	155	030	035	330	170
Volume	31'030	3'323	132	0'232	45'473
		400'000	0'000	200'000	1'000

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SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP (Continued)

State Retirees and Survivors (continued)

Benefit by Age Distribution

Present Age	Number of Members	Total Benefits	Average Benefits
less than 40	158	\$2,230,445	\$14,117
40 - 44	282	3,960,436	\$14,044
45 - 49	725	11,001,946	\$15,175
50 - 54	1,071	16,740,414	\$15,631
55 - 59	2,010	28,301,165	\$14,080
60 - 64	4,491	69,031,905	\$15,371
65 - 69	7,948	121,177,387	\$15,246
70 - 74	9,217	119,141,325	\$12,926
75 - 79	7,661	74,858,477	\$9,771
80 - 84	4,970	39,441,295	\$7,936
85 - 89	2,676	20,562,193	\$7,684
90 +	1,234	9,156,682	\$7,420
Totals	42,443	\$515,603,670	\$12,148

Present Age	0-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
0-24	867										867
25-29	4,363	494									4,857
30-34	2,092	1,747	468								4,307
35-39	1,577	1,613	1,727	399							5,316
40-44	1,830	2,029	2,281	2,762	1,821						10,715
45-49	1,443	1,957	2,297	2,273	5,926	4,755					18,650
50-54	641	976	1,355	1,130	1,882	3,837	1,139				12,960
55-59	172	378	708	674	1,050	1,800	2,159				6,941
60-64	56	159	289	284	569	687	1,048				3,092
65+	10	38	78	62	147	158	228				721
Total	13,850	9,382	9,203	7,584	11,395	13,238	4,574				68,436

SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Retirees and Survivors (continued)

Detailed by Age Distribution

Percent Age	Number of Members	Total Benefits	Average Benefits
Less than 40	153	\$2,200,442	\$14,377
40 - 44	282	2,900,438	\$10,324
45 - 49	252	11,001,948	\$43,673
50 - 54	1,071	10,700,114	\$10,084
55 - 59	2,010	28,301,192	\$14,080
60 - 64	4,491	69,031,902	\$15,371
65 - 69	7,948	121,177,382	\$15,246
70 - 74	9,217	119,141,222	\$12,928
75 - 79	7,661	74,828,472	\$9,771
80 - 84	4,970	39,441,292	\$7,936
85 - 89	2,676	20,662,192	\$7,724
90 +	1,224	9,126,682	\$7,450
Total	42,412	\$219,607,670	\$5,198

SECTION VII
INFORMATION ON SYSTEM MEMBERSHIP

Part B - Massachusetts Teachers

A critical element of an actuarial valuation is accurate and up-to-date membership information which is provided by the Retirement Board. In recognition of this fact, PERA conducted an extensive review of existing data collection methods while also analyzing actual member information submitted as of 12/31/95 by the **Teachers' Board of Retirement**.

Teachers' Active Members

About 1/4 of 1% of the active data was missing Date of Birth. In those few cases, we assumed the missing data was in the same pattern as the data which was present. These records were not included in the demographic tables on this and the following page. We assumed all the employees are full time and two thirds of the members were assumed to be married with the male spouse three years older and married members were assumed to have two children. Veteran status was not available in over 75% of the records, and for those records we assumed that 85% of the members were not veterans and 15% were veterans.

	<u>Actives</u>	<u>Vested Terms</u>
Number of Members	68,426	1,607
Average Age	45.7	48.7
Average Service	15.4	16.7
Average Salary	\$40,017	\$44,922
Average Annuity Savings Fund Balance	\$34,109	\$34,894

Age by Service Distribution of Teacher Active Members
Years of Service

<u>Present Age</u>	<u>0 - 4</u>	<u>5 - 9</u>	<u>10 - 14</u>	<u>15 - 19</u>	<u>20 - 24</u>	<u>25 - 29</u>	<u>30 +</u>	<u>Total</u>
0-24	867							867
25-29	4,363	494						4,857
30-34	2,092	1,747	468					4,307
35-39	1,577	1,613	1,727	399				5,316
40-44	1,830	2,020	2,281	2,762	1,821	1		10,715
45-49	1,442	1,957	2,297	2,273	5,926	4,755		18,650
50-54	641	976	1,355	1,130	1,882	5,837	1,139	12,960
55-59	172	378	708	674	1,050	1,800	2,159	6,941
60-64	56	159	289	284	569	687	1,048	3,092
65 +	10	38	78	62	147	158	228	721
Total	13,050	9,382	9,203	7,584	11,395	13,238	4,574	68,426

SECTION III
INFORMATION ON SYSTEM MEMBERSHIP

Carl H. Jones, Executive Director

A critical element of an actuarial valuation is accurate and up-to-date membership information which is provided by the Retirement Board. In recognition of this fact, PERA conducted an extensive review of existing data collection methods which also analyzing actual membership information submitted as of 11/1/99 by the Teachers' Board of Retirement.

Teachers' Active Members

About 1% of the active data was missing Date of Birth. In those few cases, we assumed the missing date was in the same pattern as the data which was present. These records were not included in the demographic tables on this and the following page. We assumed all the employees are full time and two thirds of the members were assumed to be married with one spouse three years older and married members were assumed to have two children. Marital status was not available in over 75% of the records, and for these records we assumed that 85% of the members were not veterans and 15% were veterans.

Percent	Age by Service Distribution of Teacher Active Members							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30+	
13.0%	9,282	9,503	7,284	11,102	13,238	4,214	68,430	
0.7%	10	38	78	63	143	198	731	
60.6%	30	129	289	264	269	687	7,092	
28.2%	173	378	708	694	1,070	1,590	6,941	
30.2%	641	970	1,322	1,130	1,381	2,217	12,060	
45.4%	1,418	1,927	2,297	2,227	2,926	4,122	18,620	
40.4%	1,730	2,020	2,281	2,762	4,821	1	10,712	
32.3%	1,877	1,612	1,227	399			7,316	
26.3%	2,092	1,747	468				4,307	
22.2%	4,262	491					4,857	
0.2%	897						897	

Number of Members	Average Age	Average Service	Average Salary	Average Annual Savings	Fund Balance
68,430	42.7	12.4	\$20,017	\$24,922	\$24,894
1,307	48.7	16.7			

SECTION VII
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Teachers' Active Members (continued)

Salary by Age Distribution of Teacher Active Members

<i>Present Age</i>	<i>Number of Participants</i>	<i>Total Salary</i>	<i>Average Salary</i>
0 - 24	867	\$20,616,608	\$23,779
25 - 29	4,857	133,427,046	27,471
30 - 34	4,307	135,274,710	31,408
	8*	353,899	44,237
35 - 39	5,316	185,697,837	34,932
	89*	4,172,445	46,881
40 - 44	10,715	413,365,410	38,578
	299*	13,504,524	45,166
45 - 49	18,650	778,822,972	41,760
	550*	24,824,552	45,136
50 - 54	12,960	576,596,696	44,490
	424*	19,496,795	45,983
55 - 59	6,941	317,997,862	45,814
	167*	7,346,513	43,991
60 - 64	3,092	143,523,623	46,418
	48*	1,771,093	36,898
65 +	721	32,866,912	45,585
	22*	720,492	32,750
Total	68,426	\$2,738,189,676	\$40,017
	1,607*	72,190,313	44,922

Actual Employee Contributions made during 1995: \$178,272,250

* Vested Terminated Members

SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Teachers' Active Members (continued)

Salary by Age Distribution of Teachers' Active Members

Age	Number of Participants	Total Salary	Average Salary
0 - 24	867	\$20,016,608	\$23,079
25 - 29	4,827	133,507,046	27,631
30 - 34	4,307	132,524,710	30,768
35 - 39	8*	327,299	40,787
40 - 44	4,218	183,607,377	43,523
45 - 49	89*	4,173,442	46,881
50 - 54	10,712	413,368,410	38,578
55 - 59	2,097	17,704,724	8,439
60 - 64	18,630	778,822,922	41,799
65 - 69	2,207	34,204,222	15,498
70 - 74	13,980	278,290,898	19,902
75 - 79	4,047	19,490,192	48,114
80 - 84	6,941	317,027,602	45,814
85 +	1,672	7,742,212	46,261
	3,002	143,323,622	47,728
	481	1,711,022	35,568
	221	22,860,912	103,442
	22*	250,492	11,386
Total	68,426	22,788,186,826	332,912
	1,007*	22,190,213	22,022

* Yested Terminated Members

Actual Employee Contributions made during 1995: \$178,322,230

SECTION VII
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Teachers' Retirees and Survivors

Retiree data had very few errors or missing information. In the few cases where assumptions were necessary, a best estimate was made based on the data available in that particular record.

	<i>Superannuation</i>	<i>Acc Dis</i>	<i>Ord Dis</i>	<i>Survivors</i>	Total
Number of Members	25,315	256	501	2,759	28,831
Average Age	72.0	62.7	64.5	69.5	71.5
Avg. Annual Benefit	\$17,331	\$23,469	\$13,175	\$7,669	\$16,388
Annuity	\$68,703,881	\$435,178	\$787,142	\$3,256,049	\$73,182,250
Pension	<u>370,026,217</u>	<u>5,572,952</u>	<u>5,813,310</u>	<u>17,901,571</u>	<u>399,314,050</u>
TOTAL	\$438,730,098	\$6,008,130	\$6,600,452	\$21,157,620	\$472,496,300

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/96

SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Teachers' Retirees and Survivors (continued)

Benefit by Age Distribution

<i>Present Age</i>	<i>Number of Members</i>	<i>Total Benefits</i>	<i>Average Benefits</i>
less than 40	30	\$160,698	\$5,357
40 - 44	63	498,862	7,918
45 - 49	340	3,585,450	10,545
50 - 54	706	8,148,743	11,542
55 - 59	1,750	29,527,060	16,873
60 - 64	4,422	96,282,543	21,774
65 - 69	6,114	124,202,998	20,315
70 - 74	4,858	79,935,424	16,454
75 - 79	3,830	51,597,889	13,472
80 - 84	2,905	34,961,971	12,035
85 - 89	2,439	28,853,160	11,830
90 +	1,374	14,741,502	10,729
Totals	28,831	\$472,496,300	\$16,388

SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Plan, Retirees and Survivors (Continued)

Benefit by Age Distribution

Percent Age	Number of Members	Total Benefit	Average Benefit
less than 40	30	2,160,098	72,003
40 - 44	63	498,802	7,918
45 - 49	340	2,282,490	6,713
50 - 54	706	8,168,743	11,571
55 - 59	1,720	29,227,069	16,993
60 - 64	4,932	96,282,243	19,524
65 - 69	6,114	124,202,998	20,315
70 - 74	4,228	70,932,424	16,754
75 - 79	2,820	21,297,869	7,552
80 - 84	2,902	24,061,971	8,291
85 - 89	2,439	28,822,160	11,819
90 +	1,224	14,241,262	11,636
Totals	28,831	242,166,200	8,398

SECTION VII
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Part C - Boston Teachers (Continued)

A critical element of an actuarial valuation is accurate and up-to-date membership information which is provided by the Retirement Board. In recognition of this fact, PERA conducted an extensive review of existing data collection methods while also analyzing actual member information submitted as of 12/31/95 by the **Boston Board of Retirement**. Numerous corrections and additions to incomplete information was required. Progress in this effort has been realized, however, the work is ongoing. In particular, those terminated members who are vested are impossible to identify. It was discovered that in previous years, no inactive members were submitted if no contributions were made during the year even if the member still had money in the system. Data for all inactive members has now been submitted, but, since the data did not include accurate information regarding final salary or service, we were unable to determine who had 10 or more years of service. We made assumptions based upon the Annuity Savings Fund Balances. However, the Boston Retirement Board must take responsibility for cleaning up this information.

In instances where accurate information was not provided by the board, we assumed all employees are full time, that two thirds of the members were married with the male spouse three years older, and that married members have two children.

Boston Teachers- Active Members

	<u>Actives</u>	<u>Vested Terms.</u>
Number of Members	6,313	602
Average Age	45.8	60.6
Average Service	14.2	24.6
Average Salary	\$39,660	\$39,576
Average Annuity Savings Fund Balance	\$32,536	\$60,332

SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Plan C - Boston Teachers

A critical element of an actuarial valuation is accurate and up-to-date membership information which is provided by the Retirement Board. In recognition of this fact, PERA conducted an extensive review of existing data collection methods while also soliciting local member information submitted as of 12/31/97 by the Boston Board of Retirement. Numerous corrections and additions to incomplete information was required. Progress in this effort has been realized, however, the work is ongoing. In particular, deceased members who are being re-identified as members is being discovered that in previous years, no relative membership was submitted if no contributions were made during the year even if the member still had money in the system. Data for all relative members has now been submitted, but since the data did not include accurate information regarding final salary or service, we were unable to determine who had 10 or more years of service. We made assumptions based upon the Annuity Savings Fund Balance. However, the Boston Retirement Board must take responsibility for cleaning up the information.

In instances where accurate information was not provided by the Board, we reviewed all employees and full time and two thirds of the members were married with the male spouse three years older and that married member has two children.

Boston Teachers - Active Members

Year/Year	Assets	Number of Members
1997	231,936	4,313
1996	232,000	4,273
1995	232,378	4,143
1994		4,000
1993		3,800
1992		3,600

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/96

SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Part C - Boston Teachers (Continued)

Age by Service Distribution of Boston Teacher Active Members

Present Age	Years of Service							Average Salary	Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 +		
0-24	115	3							118
25-29	375	73	8						456
30-34	224	217	61						502
35-39	159	212	179	37	1				588
40-44	166	207	225	148	174				920
45-49	132	192	301	104	350	345	5		1,429
50-54	81	99	140	72	148	359	162		1,061
55-59	36	68	81	45	103	110	193		636
60-64	16	26	50	27	77	83	87		366
65 +	2	13	32	25	50	58	57		237
Total	1,306	1,110	1,077	458	903	955	504		6,313

45*	1,324,671	\$31,926	
50 - 54	1,061	47,494,557	\$44,764
57*	2,067,114	\$36,265	
55 - 59	636	27,183,443	\$42,741
62*	3,661,202	\$39,796	
60 - 64	366	14,001,496	\$38,255
146*	6,174,139	\$42,289	
65 +	237	7,536,146	\$31,798
232*	9,548,253	\$41,156	
Total	6,313	\$250,372,740	\$39,660
663*	\$23,824,883	\$39,576	

Actual Employee Contributions made during 1995: \$16,321,739

* Vested Terminated Members

SECTION VII
 RECREATION DEPARTMENT MEMBERSHIP (Continued)

Part C - Home Leagues (Continued)

Age by Sex: Distribution of Dues Paying Active Members

Years of Service

Age	0-4	5-9	10-14	15-19	20-24	25-29	30+	Total
0-4	172	3						175
5-9	172	73	8					253
10-14	254	217	61					532
15-19	150	242	179	37				508
20-24	166	207	222	148	174			817
25-29	137	192	301	104	220	242		1,326
30-34	81	99	140	72	148	159	162	761
35-39	36	68	81	42	107	110	193	637
40-44	16	26	30	22	57	62	87	310
45+	2	13	32	22	20	28	27	144
Total	1,306	1,110	1,077	428	903	632	204	6,713

SECTION VII
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Boston Teachers- Active Members (continued)

Salary by Age Distribution of Boston Teacher Active Members

<i>Present Age</i>	<i>Number of Participants</i>	<i>Total Salary</i>	<i>Average Salary</i>
0 - 24	118	\$2,734,007	\$23,170
25 - 29	456	12,993,705	\$28,495
30 - 34	502	16,898,961	\$33,663
	3*	\$53,105	\$17,702
35 - 39	588	21,701,306	\$36,907
	5*	158,285	\$31,657
40 - 44	920	36,992,333	\$40,209
	22*	636,094	\$28,913
45 - 49	1,429	62,836,786	\$43,973
	45*	1,526,671	\$33,926
50 - 54	1,061	47,494,557	\$44,764
	57*	2,067,114	\$36,265
55 - 59	636	27,183,443	\$42,741
	92*	3,661,202	\$39,796
60 - 64	366	14,001,496	\$38,255
	146*	6,174,159	\$42,289
65 +	237	7,536,146	\$31,798
	232*	9,548,253	\$41,156
Total	6,313	\$250,372,740	\$39,660
	602*	\$23,824,883	\$39,576

Actual Employee Contributions made during 1995: \$16,322,739

* Vested Terminated Members

SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Boston Teachers - Active Members (continued)

Salary by Age Distribution of Boston Teachers - Active Members

Age	Number of Participants	Total Salary	Average Salary
0 - 24	118	\$2,774,007	\$23,424
25 - 29	456	15,993,705	35,074
30 - 34	702	16,898,961	24,073
35 - 39	34	233,102	6,856
40 - 44	288	21,761,768	75,232
45 - 49	21	153,282	7,299
50 - 54	250	36,992,713	147,971
55 - 59	12*	678,094	56,508
60 - 64	1,429	62,836,786	43,938
65 - 69	45*	1,326,071	29,468
70 - 74	1,081	47,864,237	44,278
75 - 79	27*	2,082,114	77,115
80 - 84	636	27,187,442	42,749
85 - 89	92*	9,661,202	105,011
90 - 94	286	19,001,496	66,439
95 +	146*	6,174,129	42,289
	273	7,276,196	26,634
	332*	9,248,223	27,853
Total	6,313	\$220,722,140	\$34,979
	607*	\$22,826,882	\$37,606

\$216,322,230

Actual Employee Contributions made during 1995

* Vested Terminated Members

SECTION VII
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Boston Teachers- Retirees and Survivors

Retiree data had very few errors or missing information. In the few cases where assumptions were necessary, a best estimate was made based on the data available in that particular record.

Retirees and Survivors

	<i>Superannuation</i>	<i>Acc Dis</i>	<i>Ord Dis</i>	<i>Survivors</i>	Total
Number of Members	1,941	58	38	220	2,257
Average Age	73.7	66.3	65.2	70.5	73.1
Avg. Annual Benefit	\$20,811	\$20,729	\$14,355	\$9,102	\$19,559
Annuity	\$5,974,901	\$75,603	\$60,428	\$300,653	\$6,411,585
Pension	<u>34,419,821</u>	<u>1,126,670</u>	<u>485,060</u>	<u>1,701,840</u>	<u>37,733,391</u>
TOTAL	\$40,394,722	\$1,202,273	\$545,488	\$2,002,493	\$44,144,976

SECTION VII
INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Boston Teachers- Retirees and Survivors (continued)Benefit by Age Distribution

<i>Present Age</i>	<i>Number of Members</i>	<i>Total Benefits</i>	<i>Average Benefits</i>
less than 40	7	\$23,382	\$3,340
40 - 44	7	41,119	\$5,874
45 - 49	19	243,025	\$12,791
50 - 54	46	676,785	\$14,713
55 - 59	125	2,635,864	\$21,087
60 - 64	245	6,237,224	\$25,458
65 - 69	418	10,198,076	\$24,397
70 - 74	407	8,717,395	\$21,419
75 - 79	329	5,674,032	\$17,246
80 - 84	244	3,859,819	\$15,819
85 - 89	292	4,293,410	\$14,703
90 +	118	1,544,845	\$13,092
Totals	2,257	\$44,144,976	\$19,559

Part B Asset Valuation Method

Assets are at market value.

Part C Valuation Method for COLA

The costs and liabilities for the COLA were calculated for 71 systems for whom we had completed valuations using the same assumptions and cost method as were used in this report. Of this 71, 25 were valued as of 1/1/94 and 31 were valued as of 1/1/95. The results of these valuations were brought forward to 1/1/96, and then the COLA costs were extrapolated from the 1/1/96 totals of the individual valuations based upon numbers of members in each category (active, vested termination, retiree and survivor). The remaining 15 systems were valued as of 1/1/96 and these results were added to the extrapolated results.

SECTION VII
 INFORMATION ON SYSTEM MEMBERSHIP (Continued)

Boston Teachers - Retirees and Survivors (continued)

Table 11 - Age Distribution

Percent Age	Number of Members	Total Benefits	Average Benefits
Less than 40	7	222,382	31,740
40 - 44	7	41,119	58,714
45 - 49	19	242,022	12,741
50 - 54	46	676,782	14,713
55 - 59	122	2,632,864	21,617
60 - 64	242	6,237,224	25,752
65 - 69	418	10,198,076	24,397
70 - 74	607	8,717,292	14,419
75 - 79	728	7,674,032	10,546
80 - 84	244	3,839,819	15,734
85 - 89	202	4,203,410	20,807
90 +	118	1,264,842	10,719
Total	2,227	24,144,026	10,829

SECTION VIII
VALUATION COST METHODS

Part A Actuarial Cost Method

The Actuarial Cost Method which was used to determine pension liabilities and costs for benefits payable under the State Employees' Contributory Retirement System, the Massachusetts Teachers' Retirement System, and for the Boston Teachers, for the year beginning January 1, 1996, is known as the Entry Age Normal Cost Method. Under this method the Normal Cost for each active participant on the valuation date is determined as the level percent of salary, which, if paid annually from the date the participant first became a member of the retirement system, would fully fund by retirement, death, disability or termination, the projected benefits which the participant is expected to receive. The Actuarial Liability for each participant is determined as the present value as of the valuation date of all projected benefits which the participant is expected to receive, minus the present value of future annual Normal Cost payments expected to be made to the fund. Since only active members have a Normal Cost, the Actuarial Liability for inactive, retirees and survivors is simply equal to the present value of all projected benefits. The sum of Normal Cost and Actuarial Liability for each participant is equal to the Normal Cost and Actuarial Liability for the Plan. The Unfunded Actuarial Liability is the Actuarial Liability minus current assets.

The Normal Cost for a participant will remain a level percent of salary for each year of participation except for changes in provisions of the Plan or the actuarial assumptions employed in projection of benefits and present value determinations. The Normal Cost for the entire system will also change due to addition of new participants or the retirement, death or termination of participants. The Actuarial Liability for a participant will increase each year to reflect the additional accrual of Normal Cost. It will also change if the Plan provisions or actuarial assumptions are changed.

Differences each year between the actual experience of the Plan and the experience projected by the actuarial assumptions are reflected by adjustments to the Unfunded Actuarial Liability. An experience difference which increases the Unfunded Actuarial Liability is called an Actuarial Loss and one which decreases the Unfunded Actuarial Liability is called an Actuarial Gain.

Part B Asset Valuation Method

Assets are at market value.

Part C Valuation Method for COLA

The costs and liabilities for the COLA were calculated for 71 systems for whom we had completed valuations using the same assumptions and cost method as were used in this report. Of this 71, 25 were valued as of 1/1/94 and 31 were valued as of 1/1/95. The results of these valuations were brought forward to 1/1/96, and then the COLA costs were extrapolated from the 1/1/96 totals of the individual valuations based upon numbers of members in each category (active, vested termination, retiree and survivor). The remaining 15 systems were valued as of 1/1/96 and these results were added to the extrapolated results.

SECTION VIII
VALUATION COST METHODS

Part A Actuarial Cost Method

The Actuarial Cost Method which was used to determine pension liabilities and costs for benefits payable under the State Employees' Compulsory Retirement System, the Massachusetts Teachers' Retirement System, and for the Boston Teachers' for the year beginning January 1, 1996, is known as the Unit Credit Actuarial Cost Method. Under this method the Normal Cost for each active participant on the valuation date is determined as the level percent of salary, which is paid annually from the date the participant first became a member of the retirement system, would fully fund by retirement, death, disability termination, the projected benefits which the participant is expected to receive. The Actuarial Liability for each participant is determined as the present value as of the valuation date of all projected benefits which the participant is expected to receive, minus the present value of future annual Normal Cost payments expected to be made to the fund. Since only active members have a Normal Cost, the Actuarial Liability for inactive, retired and survivors is simply equal to the present value of all projected benefits. The sum of Normal Cost and Actuarial Liability for each participant is equal to the Normal Cost and Actuarial Liability for the Plan. The Unfunded Actuarial Liability is the Actuarial Liability minus current assets.

The Normal Cost for a participant will contain a level percent of salary for each year of participation except for changes in provisions of the Plan or the actuarial assumptions employed in projection of benefits and present value determinations. The Normal Cost for the entire system will also change due to addition of new participants or the retirement, death or termination of participants. The Actuarial Liability for a participant will increase each year to reflect the additional accrual of Normal Cost. It will also change if the Plan provisions or actuarial assumptions are changed.

Differences each year between the actual experience of the Plan and the experience projected by the actuarial assumptions are reflected by adjustments to the Unfunded Actuarial Liability. An experience difference which increases the Unfunded Actuarial Liability is called an Actuarial Gain and one which decreases the Unfunded Actuarial Liability is called an Actuarial Loss.

Part B Asset Valuation Method

Assets are at market value.

Part C Valuation Method for COLA

The costs and liabilities for the COLA were calculated for 31 systems for which we had available valuations using the same assumptions and cost method as were used in this report. Of the 31 systems, 10 were valued as of 1/1/94 and 21 were valued as of 1/1/95. The results of these valuations were brought forward to 1/1/96, and then the COLA costs were extrapolated from the 1/1/96 costs of the individual valuations based upon numbers of members in each category (active, vested termination, retiree and survivor). The remaining 13 systems were valued as of 1/1/96 and those results were added to the extrapolated results.

SECTION XI

GLOSSARY OF TERMS

ACTUARIAL ACCRUED LIABILITY That portion of the Actuarial Present Value of pension plan benefits which is not provided by future Normal Costs or employee contributions. It is the portion of the Actuarial Present Value attributable to service rendered as of the Valuation Date.

ACTUARIAL ASSUMPTIONS Assumptions, based upon past experience or standard tables, used to predict the occurrence of future events affecting the amount and duration of pension benefits, such as: mortality, withdrawal, disablement and retirement; changes in compensation; rates of investment earnings and asset appreciation or depreciation; and any other relevant items.

ACTUARIAL COST METHOD (or FUNDING METHOD) A procedure for allocating the Actuarial Present Value of all past and future pension plan benefits to the Normal Cost and the Actuarial Accrued Liability.

ACTUARIAL GAIN OR LOSS (or EXPERIENCE GAIN or LOSS) A measure of the difference between actual experience and that expected based upon the set of Actuarial Assumptions, during the period between two Actuarial Valuation dates.

Note: The effect on the Accrued Liability and/or the Normal Cost resulting from changes in the Actuarial Assumptions, the Actuarial Cost Method or pension plan provisions would be described as such, not as an Actuarial Gain (Loss).

ACTUARIAL PRESENT VALUE The dollar value on the valuation date of all benefits expected to be paid to current members based upon the Actuarial Assumptions and the terms of the Plan.

AMORTIZATION PAYMENT That portion of the pension plan appropriation which represents payments made to pay interest on and the reduction of the Unfunded Accrued Liability.

ANNUAL STATEMENT The statement submitted to PERA each year that describes the asset holdings and Fund balances as of December 31 and the transactions during the calendar year that affected the financial condition of the retirement system.

ANNUITY RESERVE FUND The fund into which total accumulated deductions, including interest, is transferred at the time a member retires, and from which annuity payments are made.

ANNUITY SAVINGS FUND The fund in which employee contributions plus interest credited are held for active members and for former members who have not withdrawn their contributions and are not yet receiving a benefit (inactive members).

SECTION XI GLOSSARY OF TERMS

ACTUARIAL ACCRUED LIABILITY That portion of the Actuarial Present Value of pension plan benefits which is not provided by future Normal Costs or employer contributions. It is the portion of the Actuarial Present Value attributable to services rendered as of the Valuation Date.

ACTUARIAL ASSUMPTIONS Assumptions, based upon past experience or standard tables, used to predict the occurrence of future events affecting the amount and duration of pension benefits, such as: mortality, withdrawal, disability and retirement; changes in compensation; rates of investment earnings and asset appreciation or depreciation; and any other relevant items.

ACTUARIAL COST METHOD (or WINNING METHOD) A procedure for allocating the Actuarial Present Value of all past and future pension plan benefits to the Normal Cost and the Actuarial Accrued Liability.

ACTUARIAL GAIN OR LOSS (or EXPERIENCE GAIN or LOSS) A measure of the difference between actual experience and that expected based upon the set of Actuarial Assumptions, during the period between two Actuarial Valuation dates.

Plan The effect on the Accrued Liability and/or the Normal Cost resulting from changes in the Actuarial Assumptions, the Actuarial Cost Method or pension plan provisions would be described as such, not as an Actuarial Gain (Loss).

ACTUARIAL PRESENT VALUE The dollar value on the valuation date of all benefits expected to be paid to current members based upon the Actuarial Assumptions and the terms of the Plan.

AMORTIZATION PAYMENT That portion of the pension plan appropriation which represents payments made to pay interest on and the reduction of the Unfunded Accrued Liability.

ANNUAL STATEMENT The statement submitted to PERA each year that describes the assets, liabilities and fund balances as of December 31 and the transactions during the calendar year that affected the financial condition of the retirement system.

ANNUITY RESERVE FUND The fund into which total accumulated deductions, including interest, is transferred at the time a member retires, and from which annuity payments are made.

ANNUITY SAVINGS FUND The fund in which employer contributions plus interest credited are held for active members and for former members who have not withdrawn their contributions and are not yet receiving a benefit (inactive members).

SECTION XI
GLOSSARY OF TERMS (Continued)

ASSETS The value of securities as described in Section VIII.

COST OF BENEFITS The estimated payment from the pension system for benefits for the fiscal year. This is the minimum amount payable during the first six years of some Funding Schedules.

EXPENSE FUND The fund into which the appropriation for administrative expenses is paid and from which all such expenses are paid.

FUNDING SCHEDULE The schedule based upon the most recently approved actuarial valuation which sets forth the amount which would be appropriated to the pension system in accordance with Section 22D of M.G.L. Chapter 32.

GASB Governmental Accounting Standards Board

NORMAL COST Total Normal Cost is that portion of the Actuarial Present Value of pension plan benefits which is to be paid in a single fiscal year. The Employee Normal Cost is the amount of the expected employee contributions for the fiscal year. The Employer Normal Cost is the difference between the total Normal Cost and the Employee Normal Cost.

PENSION BENEFIT OBLIGATION The portion of the Actuarial Present Value attributable to past service in accordance with the Projected Unit Credit cost method as stipulated by GASB Statement Number 5.

PENSION FUND The fund into which appropriation amounts as determined by PERA are paid and from which pension benefits are paid.

PENSION RESERVE FUND The fund which shall be credited with all amounts set aside by a system for the purpose of establishing a reserve to meet future pension liabilities. These amounts would include excess interest earnings.

SPECIAL FUND FOR MILITARY SERVICE CREDIT The fund which is credited with amounts paid by the Commonwealth equal to the amount which would have been contributed by a member during a military leave of absence as if the member had remained in active service of the Commonwealth. In the event of retirement or a non-job related death, such amount is transferred to the Annuity Reserve Fund. In the event of termination prior to retirement or death, such amount shall be transferred to the Pension Fund.

UNFUNDED ACCRUED LIABILITY The excess of the Actuarial Accrued Liability over the Assets.

Age	Teachers	Other Groups	Groups 3 & 4
20	.0960	.1200	.0210
30	.0444	.0553	.0165
40	.0185	.0231	.0056
50	.0117	.0146	0

SECTION XI
GLOSSARY OF TERMS (Continued)

ASSETS The value of securities as described in Section VIII.

COST OF BENEFITS The estimated payment from the pension system for benefits for the fiscal year. This is the minimum amount payable during the first six years of some funding schedules.

EXPENSE FUND The fund into which the expenditures for administrative expenses is paid and from which all such expenses are paid.

FUNDING SCHEDULE The schedule based upon the most recently approved actuarial valuation which sets forth the amount which would be appropriated to the pension system in accordance with Section 22D of M.G.L. Chapter 32.

GASB Governmental Accounting Standards Board

NORMAL COST Total Normal Cost is that portion of the Actuarial Present Value of pension plan benefits which is to be paid in a single fiscal year. The Employer Normal Cost is the amount of the expected employer contributions for the fiscal year. The Employer Normal Cost is the difference between the total Normal Cost and the Employer Normal Cost.

PENSION BENEFIT OBLIGATION The portion of the Actuarial Present Value attributable to past service in accordance with the projected unit cost method as stipulated by GASB Statement Number 2.

PENSION FUND The fund into which appropriation amounts as determined by BRRA are paid and from which pension benefits are paid.

PENSION RESERVE FUND The fund which shall be credited with all amounts on account of a system for the purpose of establishing a reserve to meet future pension liabilities. These amounts would include excess interest earnings.

SPECIAL FUND FOR MILITARY SERVICE CREDIT The fund which is credited with amounts paid by the Commonwealth equal to the amount which would have been contributed by a member during a military leave of absence or if the member had remained in active service of the Commonwealth. In the event of retirement or a non-job related death, such amount is transferred to the Annuity Reserve Fund. In the event of termination prior to retirement or death, such amount shall be transferred to the Pension Fund.

UNFUNDED ACCRUED LIABILITY The excess of the Actuarial Present Liability over the Assets.

SECTION IX
ACTUARIAL ASSUMPTIONS

Rate of Investment Return

8 1/2% per year

Rate of Salary Increase

6% per year

Interest Rate credited to the Annuity Savings Fund

5 1/2% per year

Assumed Rate of Cost of Living Increases (COLA)

3% per year

Mortality Rate

It is also assumed that 55% of disabilities will be 1971 Group Annuity Mortality Table with ages set back one year for non-disabled males and set back six years for non-disabled females. A one-year setback means that members are assumed to die at an age one year later than would be the case under the table with no setback. The purpose of this is to reflect the improvement in the mortality rate since pre-retirement and post-retirement benefits. For disabled members, the mortality rate is assumed to be in accordance with the 1971 Group Annuity Mortality Table set forward nine years for males and set forward four years for females. It is assumed that 55% of pre-retirement deaths are job-related for group 1 and 2 members and 90% are job-related for group 3 and 4 members. For members retired under an Accidental (job-related) Disability, it is assumed that 40% of deaths are from the same cause as the disability.

Rate of Withdrawal

Based on an analysis of past experience. Sample annual rates are shown below:

Age	Teachers	Other Groups 1 & 2	Groups 3 & 4
20	.0960	.1200	.0210
30	.0444	.0555	.0165
40	.0185	.0231	.0056
50	.0117	.0146	0

SECTION IX
ACTUARIAL ASSUMPTIONS

Assumption	Rate
Rate of Investment Returns	8.75% per year
Rate of Salary Increases	6.5% per year
Interest Rate credited to the Annuity Reserve Fund	8.75% per year
Assumed Rate of Cost of Living Increases (COLA)	3% per year
Mortality Rate	1971 Group Annuity Mortality Table with ages set back one year for non-disabled males and set back six years for non-disabled females. A one-year setback means that members are assumed to die at an age one year less than would be the case under the table with no setback. The purpose of this is to reflect the improvement in the mortality rate since retirement and post-retirement benefits for disabled members. The mortality rate is assumed to be in accordance with the 1971 Group Annuity Mortality Table set forward nine years for males and ten forward four years for females. It is assumed that 25% of non-employment deaths are job-related for group 1 and 2 members and 50% are job-related for group 3 and 4 members. For members retired under an Accidental (Job-related) Disability, it is assumed that 50% of deaths within the same cause as the disability.
Rate of Withdrawals	Based on an analysis of past experience. Sample annual rates are shown below:

Age	Teachers	Other Groups	Groups 3 & 4
30	0.000	0.1200	0.210
35	0.044	0.222	0.162
40	0.182	0.231	0.058
50	0.112	0.146	0

SECTION IX
ACTUARIAL ASSUMPTIONS (Continued)

Rate of Disability

Based on an analysis of past experience. Sample annual rates are shown below:

Age	Teachers	Groups 1 & 2	Group 3	Group 4
20	0.0003	0.0006	0.0011	0.0010
30	0.0006	0.0011	0.0025	0.0023
40	0.0012	0.0024	0.0096	0.0087
50	0.0031	0.0061	0.0000	0.0110
60	0.0061	0.0123	0.0000	0.0150

Administrative Expenses

It is also assumed that 55% of disabilities will be job-related.

Rate of Retirement (Superannuation)

Based on an analysis of past experience. Annual rates are shown below:

Age	Teachers	Groups 1 & 2	Group 3	Group 4
43	0.0000		0.0030	0.0000
44	0.0000		0.0050	0.0000
45	0.0000		0.0075	0.0000
46	0.0000		0.0105	0.0000
47	0.0000		0.0500	0.0000
48	0.0000		0.0500	0.0000
49	0.0000		0.1000	0.0000
50	0.0000		0.2000	0.3201
51	0.0000		0.2500	0.0718
52	0.0000		0.2500	0.0593
53	0.0000		0.2500	0.0803
54	0.0000		0.2500	0.0769
55	0.1255		1.0000	0.1554
56	0.0321		1.0000	0.0907
57	0.0310		1.0000	0.0909
58	0.0334		1.0000	0.1194
59	0.0348		1.0000	0.1136
60	0.0784		1.0000	0.2395
61	0.0692		1.0000	0.1360
62	0.1511		1.0000	0.1950
63	0.1071		1.0000	0.1253
64	0.1037		1.0000	0.1873
65	0.3568		1.0000	1.0000

SECTION IX
ACTUARIAL ASSUMPTIONS (Continued)

Based on an analysis of past experience. Assumptions shown below:

Age	1998	1997	1996	1995
20	0.001	0.001	0.001	0.001
25	0.001	0.001	0.001	0.001
30	0.001	0.001	0.001	0.001
35	0.001	0.001	0.001	0.001
40	0.001	0.001	0.001	0.001

It is also assumed that 55% of disabilities will be job-related.

Based on an analysis of past experience. Assumptions shown below:

Age	1998	1997	1996	1995
20	0.001	0.001	0.001	0.001
21	0.001	0.001	0.001	0.001
22	0.001	0.001	0.001	0.001
23	0.001	0.001	0.001	0.001
24	0.001	0.001	0.001	0.001
25	0.001	0.001	0.001	0.001
26	0.001	0.001	0.001	0.001
27	0.001	0.001	0.001	0.001
28	0.001	0.001	0.001	0.001
29	0.001	0.001	0.001	0.001
30	0.001	0.001	0.001	0.001
31	0.001	0.001	0.001	0.001
32	0.001	0.001	0.001	0.001
33	0.001	0.001	0.001	0.001
34	0.001	0.001	0.001	0.001
35	0.001	0.001	0.001	0.001
36	0.001	0.001	0.001	0.001
37	0.001	0.001	0.001	0.001
38	0.001	0.001	0.001	0.001
39	0.001	0.001	0.001	0.001
40	0.001	0.001	0.001	0.001
41	0.001	0.001	0.001	0.001
42	0.001	0.001	0.001	0.001
43	0.001	0.001	0.001	0.001
44	0.001	0.001	0.001	0.001
45	0.001	0.001	0.001	0.001

Commonwealth's Total Pension Obligation Actuarial Valuation - 1/1/96

SECTION IX
 SUMMARY OF PLAN ASSUMPTIONS OF JANUARY 1, 1996
 ACTUARIAL ASSUMPTIONS (Continued)

ADMINISTRATION: There are 106 contributory retirement systems for public employees in Massachusetts. Each system is governed by its own retirement law, although many are administered independently, are governed by the same retirement law, or are administered under Chapter 32 of the Massachusetts General Laws. This law in general provides uniform benefits, uniform contribution rates, uniform investment accounting and funds structure for all systems.

Age	Teachers Groups 1 & 2	Group 3	Group 4
66	0.2214	1.0000	1.0000
67	0.2159	1.0000	1.0000
68	0.2164	1.0000	1.0000
69	0.2536	1.0000	1.0000
70	1.0000	1.0000	1.0000

PARTICIPATION: Participation is mandatory for full-time employees. Eligibility with respect to part-time, provisional, temporary, seasonal or intermittent employment is governed by regulations promulgated by the retirement board, and approved by the Commissioner of PERA. Membership is required for all public employees, including elected officials.

Administrative Expenses Assumed to be paid separately and are not included in the appropriation.

There are four classes of membership in the system:

Assumptions made with respect to data are discussed in Section VII.

- Group 1 - Administrative, technical and all other employees not otherwise classified.
- Group 2 - Certain specified hazardous duty positions.
- Group 3 - State Police Officers and Inspectors.
- Group 4 - Police officers, firefighters, state correction officers and other hazardous positions specified in the statute.

MEMBER CONTRIBUTIONS: Member contributions vary depending on the most recent date of membership:

- Prior to 1975 - 5% of regular compensation
- 1975 - 1983 - 7% of regular compensation
- 1984 to 6/30/96 - 8% of regular compensation
- 7/1/96 to present - 9% of regular compensation
- 7/1/96 to present - 12% - State Police
- 1979 to present - an additional 2% of regular compensation in excess of \$30,000

RATE OF INTEREST: Regular Interest on regular deductions made after January 1, 1984 is a rate established by the Commissioner of PERA in consultation with the Commissioner of Banks. The rate is obtained from the average rates paid on individual savings accounts by a representative sample of at least 10 financial institutions.

RETIREMENT AGE: There is no mandatory retirement age for most employees. Certain public safety personnel are required to retire at age 61. Mandatory retirement age for state police officers is age 55, but the Commonwealth has been enjoined from enforcing this provision in conjunction with ongoing litigation.

Members over the age of 70 may elect to continue making contributions on regular compensation and continue to accrue additional years of creditable service.

SECTION IX
 ACTUARIAL ASSUMPTIONS (Continued)

Group	Rate	Assumption	Rate
1-1000	1.0000	0.2514	0.25
1-1000	1.0000	0.2129	0.21
1-1000	1.0000	0.2164	0.22
1-1000	1.0000	0.2228	0.22
1-1000	1.0000	1.0000	1.00

Assumed to be paid quarterly and are not included in the application.

Administrative Expenses

Assumptions made with respect to data are discussed in Section VII.

SECTION X
SUMMARY OF PLAN PROVISIONS, AS OF JANUARY 1, 1996

ADMINISTRATION : There are 106 contributory retirement systems for public employees in Massachusetts. Each system is governed by a retirement board and all boards, although operating independently, are governed by one retirement law, Chapter 32 of the Massachusetts General Laws. This law in general provides uniform benefits, uniform contribution requirements and a uniform accounting and funds structure for all systems.

PARTICIPATION : Participation is mandatory for all full-time employees. Eligibility with respect to part-time, provisional, temporary, seasonal or intermittent employment is governed by regulations promulgated by the retirement board, and approved by the Commissioner of PERA. Membership is optional for certain elected officials.

There are four classes of membership in the retirement system:

Group 1 - General employees, including teachers, clerical, administrative, technical and all other employees not otherwise classified.

Group 2 - Certain specified hazardous duty positions.

Group 3 - State Police Officers and Inspectors.

Group 4 - Police officers, firefighters, state correction officers and other hazardous positions specified in the statute.

MEMBER CONTRIBUTIONS : Member contributions vary depending on the most recent date of membership:

Prior to 1975 - 5% of regular compensation

1975 - 1983 - 7% of regular compensation

1984 to 6/30/96 - 8% of regular compensation

7/1/96 to present - 9% of regular compensation

7/1/96 to present - 12% - State Police

1979 to present - an additional 2% of regular compensation in excess of \$30,000.

RATE OF INTEREST : Regular Interest on regular deductions made after January 1, 1984 is a rate established by the Commissioner of PERA in consultation with the Commissioner of Banks. The rate is obtained from the average rates paid on individual savings accounts by a representative sample of at least 10 financial institutions.

RETIREMENT AGE : There is no mandatory retirement age for most employees. Certain public safety personnel are required to retire at age 65. Mandatory retirement age for state police officers is age 55, but the Commonwealth has been enjoined from enforcing this provision in conjunction with ongoing litigation.

Members over the age of 70 may elect to continue making contributions on regular compensation and continue to accrue additional years of creditable service.

SECTION X

SUMMARY OF PLAN PROVISIONS AS OF JANUARY 1, 1984

ADMINISTRATION: There are 100 contributory retirement systems for public employees in Massachusetts. Each system is governed by a management board and all boards, although operating independently, are governed by one retirement law, Chapter 151 of the Massachusetts General Laws. The law in general provides uniform benefits, uniform contribution requirements and a uniform accounting and bookkeeping for all systems.

MEMBERSHIP: Membership is mandatory for all full-time employees. Eligibility with respect to part-time, provisional, temporary, seasonal or intermittent employment is governed by regulations promulgated by the retirement board, and approved by the Commissioner of PERA. Membership is optional for certain elected officials.

There are four classes of membership in the retirement system:

- Group 1 - General employees, including teachers, clerical, administrative, technical and all other employees not otherwise classified.
- Group 2 - Certain specified hazardous duty positions.
- Group 3 - State Police Officers and Inspectors.
- Group 4 - Police officers, firefighters, state correction officers and other hazardous positions specified in the statute.

MEMBER CONTRIBUTIONS: Member contributions vary depending on the most recent date of membership:

- 1977 to present - an additional 2% of regular compensation in excess of \$30,000.
- 1976 to present - 12% - State Police
- 1976 to present - 7% of regular compensation
- 1974 to 1975 - 8% of regular compensation
- 1972 - 1975 - 5% of regular compensation
- 1972 - 1975 - 7% of regular compensation
- 1971 to 1975 - 8% of regular compensation

RATE OF INTEREST: Regular interest on regular deductions made after January 1, 1984 is a rate established by the Commissioner of PERA in consultation with the Commissioner of Health. The rate is derived from the average rates paid on individual savings accounts by a representative sample of last 10 financial institutions.

RETIREMENT AGE: There is no mandatory retirement age for most employees. Certain public safety personnel are required to retire at age 65. Mandatory retirement age for state police officers is age 55, but the Commonwealth has been enjoined from enforcing this provision in connection with ongoing litigation.

Members over the age of 70 may elect to continue making contributions on regular compensation and continue to accrue additional years of creditable service.

SECTION X
SUMMARY OF PLAN PROVISIONS (Continued)

SUPERANNUATION RETIREMENT : A member is eligible for a superannuation retirement allowance (service retirement), upon meeting the following conditions:

completion of 20 years of service, or

attainment of age 55 if hired prior to 1978, or

hired after 1978, with 10 years of service and age 55.

AMOUNT OF BENEFIT : A member's annual allowance is determined by multiplying average salary by a benefit rate related to the member's age and job classification at retirement, and the resulting product by his creditable service. The amount determined by the benefit formula cannot exceed 80% of the employees' highest three year average salary. (75% for Group 3 members) For veterans as defined in G.L. c. 32, s. 1, there is an additional benefit of \$15 per year for each year of service, up to a maximum of 20 years.

Salary is defined as gross regular compensation.

Average Salary is the average annual rate of regular compensation received during the 3 consecutive years that produce the highest average, or, if greater, during the last three years (whether or not consecutive) preceding retirement.

The Benefit Rate varies with the member's retirement age, but the highest rate of 2.5% applies to Group 1 employees who retire at or after age 65, Group 2 employees who retire at or after age 60, and Group 4 employees who retire at or after age 55. A .1% reduction is applied for each year of age under the maximum age for the member's group. For Group 2 employees who terminate from service under age 55, the benefit rate for a Group 1 employee shall be used.

For Group 3 members, the rate is 3 % for any age.

DEFERRED VESTED BENEFIT : A participant who has completed 10 or more years of creditable service is eligible for a deferred vested retirement benefit. Elected officials and others who were hired prior to 1978 may be vested after 6 years in accordance with G.L. c. 32, s. 10.

The participant's accrued benefit is payable commencing at age 55, or the completion of 20 years, or may be deferred until later at the participant's option.

WITHDRAWAL OF CONTRIBUTIONS : If a member is under age 55, member contributions may be withdrawn. Employees who first become members on or after January 1, 1984, may receive only limited interest on their contributions if they voluntarily terminate their service. Those who leave service with less than 5 years receive no interest; those who leave service with greater than 5 but less than 10 years receive 50% of interest.

SECTION 2
SUMMARY OF THE PROVISIONS (Continued)

RETRIBUTION RETIREMENT: A member is eligible for a retribution retirement allowance (service retirement) upon meeting the following conditions:

- completion of 20 years of service or
- attainment of age 55 if hired prior to 1978, or
- hired after 1978, with 10 years of service and age 55.

AMOUNT OF BENEFIT: A member's annual allowance is determined by multiplying average salary by a benefit rate related to the member's age and job classification at retirement, and the resulting product by his constant service. The constant determined by the benefit formula cannot exceed 80% of the employee's highest three year average salary (75% for Group 3 members). For veterans as defined in G.L. c. 32, there is an additional benefit of 2% per year for each year of service up to a maximum of 20 years.

Salary is defined as gross regular compensation.

Average salary is the average annual rate of regular compensation received during the 3 consecutive years that produce the highest average, or, if greater, during the last three years (whether or not consecutively) preceding retirement.

The benefit rate varies with the member's retirement age but the highest rate of 5.25% applies to Group 1 employees who retire at or after age 62, Group 2 employees who retire at or after age 60 and Group 3 employees who retire at or after age 55. A 1% reduction is applied for each year of age under the maximum age for the member's group. For Group 3 employees who terminate from service under age 55, the benefit rate for a Group 1 employee shall be used.

For Group 3 members, the rate is 3% for each age.

DEFERRED VESTED BENEFIT: A participant who has completed 10 or more years of creditable service is eligible for a deferred vested retirement benefit. Elected officials and others who were hired prior to 1978 may be vested after 5 years in accordance with G.L. c. 32, s. 10.

The participant's accrued benefit is payable commencing at age 55 or the completion of 20 years, or may be deferred until later at the participant's option.

RETURN AS A % OF CONTRIBUTIONS: If a member is under age 55, member contributions may be withdrawn. Employees who first become members on or after January 1, 1981, may receive only limited interest on their contributions if they voluntarily terminate their service. Those who leave service with less than 5 years receive no interest; those who leave service with greater than 5 but less than 10 years receive 50% of interest.

SECTION X
SUMMARY OF PLAN PROVISIONS (Continued)

DISABILITY RETIREMENT: The Massachusetts Retirement Plan provides 2 types of disability retirement benefits:

Ordinary Disability:

Eligibility: Non-veterans who become totally and permanently disabled by reason of a non-job related condition before attaining age 55 with at least 10 years of creditable service.

Veterans with ten years of creditable service who become totally and permanently disabled by reason of a non-job related condition prior to reaching "maximum age".

Retirement Allowance: Equal to the accrued superannuation retirement benefit as if the member was age 55. If the member is a veteran, the benefit is 50% of the member's final rate of salary during the preceding 12 months, plus an annuity based upon accumulated member contributions plus credited interest. If the member is over age 55, he or she will receive not less than the superannuation allowance to which he or she is entitled.

Accidental Disability:

Eligibility: Applies to members who become permanently and totally incapacitated for further duty as a result of a personal injury sustained or hazard undergone while in the performance of duties. There are no minimum age or service requirements. The member must file his or her application prior to attaining statutory "maximum age."

Retirement Allowance: 72% of salary plus an annuity based on accumulated member contributions, with interest. This amount is not to exceed 100% of pay. (75% for members hired after 1987) There is an additional pension of \$486.72 per year (or \$312.00 per year in systems in which the local option contained in G.L. c. 32, s.7(2)(b)(iii) has not been adopted), per child who is under 18 at the time of the member's retirement, with no age limitation if the child is mentally or physically incapacitated from earning. The additional pension may continue up to age 21 for any child who is a full time student at an accredited educational institution. Those who became members in service after January 1, 1988 or who have not been members in service continually since that date.

ACCIDENTAL DEATH

Eligibility: Applies to members who die as a result of a work-related injury or if the member was retired for accidental disability and the death was the natural and proximate result of the injury or hazard undergone on account of which such member was retired.

SECTION 2
SUMMARY OF PLAN PROVISIONS (continued)

DISABILITY RETIREMENT: The plan provides for a type of disability retirement benefit.

Primary Disability:

Eligibility: Non-veterans who become totally and permanently disabled by reason of a non-job related condition before attaining age 55 with at least 10 years of creditable service.

Veterans with ten years of creditable service who become totally and permanently disabled by reason of a non-job related condition prior to reaching "maximum age."

Payment Allowance: Equal to the amount of the member's normal retirement benefit as if the member was age 55. If the member is a veteran, the benefit is 50% of the member's final rate of salary during the preceding 12 months plus an amount based upon accumulated member contributions plus capital interest. If the member is over age 55, he or she will receive not less than the expectation allowance to which he or she is entitled.

Accidental Death:

Eligibility: Applies to members who become permanently and totally incapacitated for further duty as a result of a personal injury sustained on duty while in the performance of duty. There are no minimum age or service requirements. The member must file his or her application prior to attaining maximum age.

Payment Allowance: 75% of salary plus an amount based on accumulated member contributions with interest. The amount is not to exceed \$10,000 per year (75% for members hired after 1957). There is an additional benefit of \$48,000 per year (or \$11,500 per year in systems in which the local office is contained in G.I. 12, 27(2)(b)) has not been adopted) per child who is under 18 at the time of the member's retirement, with no age limitation if the child is mentally or physically incapacitated from infancy. The additional benefit may continue up to age 21 for any child who is a full-time student at an accredited educational institution. There are no service requirements in service after January 1, 1958 or who have not been members in service continuously since that date.

ACCIDENTAL DEATH

Eligibility: Applies to members who die as a result of a work-related injury or if the member was killed for accidental disability and the death was the natural and proximate result of the injury or hazard undergone on account of which such member was retired.

SECTION X
SUMMARY OF PLAN PROVISIONS (Continued)

METHODS OF PAYMENT

Allowance: An immediate payment to a named beneficiary equal to the accumulated deductions at the time of death, plus a pension equal to 72% of current salary and payable to the surviving spouse, dependent children or the dependent parent, plus a supplement of \$312 per year, per child, payable to the spouse or legal guardian until all dependent children reach age 18 or 21 if a full time student, unless mentally or physically incapacitated.

Option B: A reduced annual allowance, payable in monthly installments, commencing at retirement. The surviving spouse of a member of a police department or fire department or any corrections officer who, under specific and limited circumstances detailed in the statute, suffers an accident and is killed or sustains injuries resulting in his death, may receive a pension equal to the maximum salary for the position held by the member upon his death. In addition, an eligible family member may receive a one time payment of \$100,000.00 from the State Retirement Board.

Option C: A reduced annual allowance, payable in monthly installments, commencing at retirement.

DEATH AFTER ACCIDENTAL DISABILITY RETIREMENT

If the member's death is from a cause unrelated to the condition for which the member received accidental disability benefits, the spouse will receive an annual allowance of \$6,000 until remarriage or death.

Option C: A reduced annual allowance, payable in monthly installments, commencing at retirement.

DEATH IN ACTIVE SERVICE :

ALLOCATION OF PENSION COSTS : If a member's total creditable service was partly earned by

Eligibility: At least 2 years of service

of the different systems pro rata based on the member's service within each retirement system.

Allowance: An allowance equal to that which would have been payable had the member retired and elected Option C on the day before his or her death. For death occurring prior to the member's superannuation retirement age, the age 55 benefit rate is used. The minimum annual allowance payable to the surviving spouse of a member in service who dies with at least two years of creditable service is \$3,000, provided that the member and the spouse were married for at least one year and living together on the member's date of death.

The surviving spouse of such a member in service receives an additional allowance equal to the sum of \$1,440 per year for the first child and \$1,080 per year for each additional child.

COST OF LIVING

The first \$9,000 of a retiree's total allowance is subject to a cost-of-living adjustment related to a change of at least 3% in the Consumer Price Index. This benefit is subject to an annual vote of the Massachusetts General Court.

SECTION 3
SUMMARY OF PLAN PROVISIONS (Continued)

Allowance: An immediate payment to a named beneficiary equal to the accumulated deductions at the time of death, plus a return equal to 7.5% of current salary and payable to the surviving spouse dependent children of the dependent parent, plus a payment of \$212 per year per child, payable to the spouse or legal guardian until all dependent children reach age 18 or 21 if a full time student, until a monthly or physical incapacity.

The surviving spouse of a member of a police department or fire department or any other officer who, under specific and limited circumstances detailed in the statute, suffers an accident and is killed or remains injured resulting in his death, may receive a lump sum equal to the maximum salary for the position held by the member upon his death. In addition, an eligible family member may receive a one time payment of \$100,000 from the State Retirement Board.

DEATH AFTER ACCIDENTAL DISABILITY RETIREMENT

If the member's death is from a cause unrelated to the condition for which the member retired or accidental disability benefits, the spouse will receive an annual allowance of \$4,000 until remarriage or death.

DEATH BENEFIT SERVICE

Eligibility: At least 2 years of service.

Allowance: An allowance equal to that which would have been payable had the member retired and placed Option C on the day before his or her death. For death occurring prior to the member's superannuation retirement age, the age 55 benefit rate is used. The minimum annual allowance payable to the surviving spouse of a member in service who dies with at least two years of creditable service is \$2,000 provided that the member and the spouse were married for at least one year and living together on the member's date of death.

The surviving spouse of such a member in service receives an additional allowance equal to the sum of \$1,400 per year for the first child and \$1,000 per year for each additional child.

COST OF LIVING

The first \$4,000 of a retiree's total allowance is subject to a cost-of-living adjustment related to changes or to rate in the Consumer Price Index. This benefit is subject to an annual cost-of-living adjustment.

Massachusetts General Court

SECTION X
SUMMARY OF PLAN PROVISIONS (Continued)

METHODS OF PAYMENT

A member may elect to receive his or her retirement allowance in one of 3 optional forms of payment.

Option A: Total annual allowance, payable in monthly installments, commencing at retirement and terminating at the member's death.

Option B: A reduced annual allowance, payable in monthly installments, commencing at retirement and terminating at the death of the member, provided, however, that if the total amount of the annuity portion received by the member is less than the amount of his or her accumulated deductions, including interest, the difference or balance of his accumulated deductions will be paid in a lump sum to the retiree's beneficiary or beneficiaries of choice.

Option C: A reduced annual allowance, payable in monthly installments, commencing at retirement. At the death of the retired employee, $\frac{2}{3}$ of the allowance is payable to the member's designated beneficiary (who may be the spouse, or former spouse who remains unmarried for a member whose retirement becomes effective on or after February 2, 1992, child, parent, sister, or brother of the employee) for the life of the beneficiary. For members who retired on or after January 12, 1988, if the beneficiary pre-deceases the retiree, the benefit payable increases (or pops up) to the amount which would have been payable under Option A. Option C is not available to accidental disability recipients.

ALLOCATION OF PENSION COSTS : If a member's total creditable service was partly earned by employment in more than one retirement system, the cost of the "pension portion" is allocated between the different systems pro rata based on the member's service within each retirement system.