

THE WYATT COMPANY
1055 Washington Boulevard
Stamford, Connecticut 06901
(203) 356-1220

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

REPORT ON THE
ACTUARIAL VALUATION AS OF JUNE 30, 1989

January 10, 1990

January 10, 1990

State Teachers' Retirement Board
State of Connecticut
165 Capitol Avenue
Hartford, CT 06106

Re: Actuarial Valuation of the State Teachers'
Retirement System as of June 30, 1989

Dear Members of the Board:

Under the supervision and direction of the undersigned, The Wyatt Company has prepared an actuarial valuation of the State Teachers' Retirement System as of June 30, 1989 in accordance with generally accepted actuarial principles and practices. To the best of our knowledge, the results set forth in this report are complete and accurate and the contribution requirement for the State of Connecticut developed for the fiscal year ending June 30, 1991 as well as the actuarial present value of accrued benefits shown herein fairly reflect the status of the System at the times indicated.

In preparing this report, we have relied upon the following:

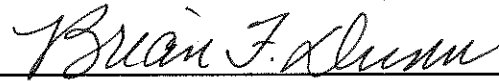
- Member census data as of June 30, 1989 submitted by the Board. This data was not audited by us, but was checked for reasonableness and appears to be sufficient for the purposes of this report.
- Financial data as of June 30, 1989 provided by the State Treasurer's Office and the Board. This data was not audited by us, but appears to be sufficient for the purposes of this report.
- Revised actuarial assumptions which, in the aggregate, are reasonably related to the past experience of the System and to expected future results. These assumptions were approved by the Board at its meeting on November 29, 1989.
- Actuarial methods and the provisions of the System which are summarized in this report. Included is the change in the method of developing the actuarial value of assets which the Board also approved at its November meeting.

State Teachers' Retirement Board
January 10, 1990
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If, in connection with this actuarial valuation of the System, you have any other investigations which you would like us to conduct, or if any questions arise in connection with this report, we will be pleased to proceed according to your instructions.

Respectfully submitted,

THE WYATT COMPANY



Brian F. Dunn
Associate, Society of Actuaries



Walter W. Siegel
Fellow, Society of Actuaries

BFD/WWS/cd

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

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STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
PURPOSE AND SCOPE

This report has been prepared by The Wyatt Company to:

- Present the principal results of the actuarial valuation of the State Teachers' Retirement System as of June 30, 1989, based on the revised actuarial assumptions and methods approved by the Board at its November 29, 1989 meeting;
- Compare these results with those from the previous valuation;
- Provide to the State Teachers' Retirement Board the contribution requirement for the State under Public Act 79-436 (as amended) for the fiscal year ending June 30, 1991; and
- Provide information about the financial status of the System, including a measure of the extent to which benefits have been funded.

The introduction to this document presents a summary of the principal results of the June 30, 1989 actuarial valuation, including the State contribution requirement for the fiscal year ending June 30, 1991 and the funded status of the System as of June 30, 1989. A comparison of these results with those from the previous valuation is also included.

Exhibit 1 shows the determination of the unfunded actuarial accrued liability and the normal cost for the year. In Exhibit 2, we develop the State contribution requirement for the fiscal year ending June 30, 1991 in accordance with Public Act 79-436 (as amended).

It should be noted that the Member census data as of June 30, 1989 reflects the third and final year of salary increases attributable to the Education Enhancement Act. Exhibit 3 incorporates the impact of the Education Enhancement Act in three sets of projections of the State's future contribution requirements.

Exhibit 4 is an historical review of the funded status of the System.

Exhibit 5 consists of a reconciliation of the market value of assets from July 1, 1988 to June 30, 1989. In Exhibit 6 we develop the actuarial value of assets to be used in determining the State contribution requirement.

In Exhibit 7 and the accompanying charts, we present information regarding the census data for the Members of the System.

The principal provisions of the System are outlined in Exhibit 8, while the actuarial assumptions and cost methods used in this valuation are summarized in Exhibit 9.

At the request of the co-chairpersons of the Appropriations Committee of the State Legislature, we developed the State contribution requirement for the fiscal year ending June 30, 1991, using the projected unit credit actuarial cost method in place of the entry age actuarial cost method. Results of these alternative calculations appear in Exhibit 10.

The report concludes with descriptions of the entry age actuarial cost method and the projected unit credit actuarial cost method.

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
SUMMARY OF PRINCIPAL VALUATION RESULTS

A. Important Changes

Since the last actuarial valuation of the System as of June 30, 1987, the State Legislature enacted P.A. 89-333 which requires that the System be valued on the basis of an 8½% interest rate assumption.

At its November 29, 1989 meeting, the State Teachers' Retirement Board approved changes in certain other actuarial assumptions and methods as a result of an experience study of the System.

These changes and their effects on the costs and liabilities of the System are included in this report.

B. Contribution Requirement

The State contribution requirement for the fiscal year ending June 30, 1991 was determined in accordance with Public Act 79-436 (as amended) and was based on the revised actuarial assumptions and methods referenced above.

Contribution Requirement for the Fiscal Year Ending June 30, 1991	\$ 304,331,000
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A detailed development of this contribution requirement is included as Exhibit 2.

C. Funded Status of the System

The funded status of the System as of June 30, 1989 was measured by comparing the market value of assets with the actuarial present value of accrued benefits as of that date. This actuarial present value of accrued benefits was based on Members' service as of the valuation date with salary projected to retirement using the revised actuarial assumptions.

1. Actuarial Present Values for:

a.	Retired Teachers, Beneficiaries, Survivors, Dependents, and Other Inactive Teachers	\$ 2,052,961,000
b.	Active Teachers	3,757,694,000
c.	Member Contributions	<u>1,279,520,000</u>
d.	Total	\$ 7,090,175,000

2. Market Value of Assets \$ 4,136,564,000

3. Funded Ratio: Item 2 ÷ Item 1.d. 58.3%

A review of the recent history of the funded ratio of the System is presented in Exhibit 4.

STATE OF CONNECTICUT

STATE TEACHERS' RETIREMENT SYSTEM

COMPARISON OF PRINCIPAL VALUATION RESULTS

A summary of the principal valuation results from the current valuation (under both the prior and the revised actuarial assumptions and methods) and from the previous valuation (as of June 30, 1987) follows.

	<u>Actuarial Valuation of the System as of</u>	
	<u>June 30, 1987</u>	<u>June 30, 1989</u>
	(Prior Assumptions and Methods)	(Revised Assumptions and Methods)
A. <u>Summary of Data</u>		
1. Number of Members		
a. Active	39,014	40,258
b. Terminated Vested and Inactive	1,734	1,922
c. Retired and Beneficiaries	12,207	13,164
d. Survivors and Dependents	<u>485</u>	<u>504</u>
e. Total	53,440	55,848
2. Characteristics of Active Members		
a. Total Compensation	\$1,193,463,000	\$1,540,789,000
b. Average Annual Compensation	\$30,590	\$38,273
c. Average Age	43.4	44.1
d. Average Service	14.3	14.6

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
COMPARISON OF PRINCIPAL VALUATION RESULTS

	Actuarial Valuation of the System as of	
	June 30, 1987	June 30, 1989
	(Prior Assumptions and Methods)	(Revised Assumptions and Methods)
B. <u>Summary of Costs</u>		
1. Normal Cost		
a. Amount	\$ 151,005,000	\$ 127,787,000
b. As a Percent of Covered Compensation	12.7%	8.3%
2. Actuarial Accrued Liability	\$ 7,177,957,000	\$ 7,944,175,000
3. Valuation Assets	\$ 2,566,301,000	\$ 3,600,763,000
4. Unfunded Actuarial Accrued Liability	\$ 4,611,656,000	\$ 4,343,412,000
5. State Contribution Requirement for Fiscal Year Ending 6/30/89, 6/30/91, Respectively	\$ 302,917,000	\$ 304,331,000

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
COMPARISON OF PRINCIPAL VALUATION RESULTS

	Actuarial Valuation of the System as of	
	June 30, 1987	June 30, 1989
	(Prior Assumptions and Methods)	(Revised Assumptions and Methods)
C. <u>Assets and Actuarial Present Values</u>		
1. Assets		
a. Actuarial Value	\$2,566,301,000	\$3,583,370,000
b. Market Value	\$3,188,223,000	\$4,136,564,000
2. Actuarial Present Value of Accrued Benefits		
a. Member Contributions	\$1,021,663,000	\$1,279,520,000
b. Retired Members, Beneficiaries, Survivors, Dependents, and Other Inactive Teachers	1,821,695,000	2,308,018,000
c. Other Members	<u>3,450,354,000</u>	<u>4,726,968,000</u>
d. Total	<u>\$6,293,712,000</u>	<u>\$8,314,506,000</u>
		2,052,961,000
		<u>3,757,694,000</u>
		<u>\$7,090,175,000</u>

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

DETERMINATION OF THE UNFUNDED ACTUARIAL ACCRUED LIABILITY
AND THE NORMAL COST

The actuarial cost method used to determine the State contribution to the System is the entry age actuarial cost method. Under this method, the normal cost for retirement benefits for each Member is defined as the level percent of the Member's salary needed as an annual contribution from entry age to retirement age to fund the Member's projected benefit. The actuarial accrued liability is the accumulated value of such normal costs for each Member from entry age to the date of the current valuation. (Note: Under this actuarial cost method, the actuarial accrued liability does not represent the liability for benefits accrued as of the valuation date.) The unfunded actuarial accrued liability is the excess of the actuarial accrued liability over the actuarial value of the System's assets.

A. Unfunded Actuarial Accrued Liability

1. Actuarial Accrued Liability for Retirement Benefits

a. Member Contributions	\$ 1,279,520,000
b. Active Teachers	4,611,694,000
c. Terminated Vested and Inactive Teachers	1,729,000
d. Retired Teachers and Beneficiaries	2,038,373,000
e. Survivors and Dependents	<u>12,859,000</u>
f. Total	\$ 7,944,175,000

2. Actuarial Value of Assets

3,600,763,000

3. Unfunded Actuarial Accrued Liability:
Item 1f. - Item 2

\$ 4,343,412,000

B. Normal Cost

1. Normal Cost as of July 1, 1989	\$ 127,787,000
2. Annual Compensation of Active Teachers	1,540,789,000
3. Normal Cost as a Percent of Annual Compensation	8.3%

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
DEVELOPMENT OF THE STATE CONTRIBUTION REQUIREMENT
FOR THE FISCAL YEAR ENDING JUNE 30, 1991

The State contribution requirement for the fiscal year ending June 30, 1991 was determined in accordance with Public Act 79-436 (as amended) and was based on the expected unfunded actuarial accrued liability as of June 30, 1990 and an estimate of the July 1, 1990 normal cost. This estimate was based on the July 1, 1989 normal cost and an estimate of future salary increases.

To develop the expected unfunded actuarial accrued liability as of June 30, 1990, the actual unfunded actuarial accrued liability as of June 30, 1989 was added to the normal cost as of July 1, 1989 and this sum was adjusted for one year's interest at the new valuation rate of 8.5% per annum. This result was then reduced by the State contributions adjusted with interest. The expected unfunded actuarial accrued liability was then amortized in accordance with Public Act 79-436 (as amended) which requires that changes after 1980 be funded separately by contributions of normal cost plus 30-year amortization of the applicable unfunded actuarial accrued liability.

As shown on the following page, the expected unfunded actuarial accrued liability and the contribution for the amendments to the System resulting from Public Acts 82-91 and 87-381 were developed separately. There was no normal cost associated with Public Acts 82-91 and 87-381 because they affected only retired Members.

The State contribution requirement for the fiscal year ending June 30, 1991 is \$304,331,000 based on the revised assumptions and methods approved by the Board. In the absence of any of these changes, the State contribution requirement for the fiscal year ending June 30, 1991 would have been \$408,198,000.

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
DEVELOPMENT OF THE STATE CONTRIBUTION REQUIREMENT FOR THE FISCAL YEAR ENDING JUNE 30, 1991

Exhibit 2
(Continued)

	Provisions in Effect June 30, 1980	Public Act 82-91	Public Act 87-381	Total
1. Unfunded Actuarial Accrued Liability as of 6/30/89	\$ 4,312,169,000	\$ 29,696,000	\$ 1,547,000	\$ 4,343,412,000
2. Normal Cost as of 7/1/89	127,787,000	0	0	127,787,000
3. Interest at 8.5% on (Item 1+Item 2)	377,396,000	2,524,000	131,000	380,051,000
4. State Contributions	(319,832,000)	(1,728,000)	(79,000)	(321,639,000)
5. Interest to End of Year on Item 4	<u>(16,818,000)</u>	<u>(91,000)</u>	<u>(4,000)</u>	<u>(16,913,000)</u>
6. Expected Unfunded Actuarial Accrued Liability as of 6/30/90	\$ 4,480,702,000	\$ 30,401,000	\$ 1,595,000	\$ 4,512,698,000
7. Level Percent Amortization Payment (40/23/28 Years)	183,750,000	1,769,000	81,000	185,600,000
8. Estimated Normal Cost as of 7/1/90	<u>142,238,000</u>	<u>0</u>	<u>0</u>	<u>142,238,000</u>
9. Total: Item 7 + Item 8	\$ 325,988,000	\$ 1,769,000	\$ 81,000	\$ 327,838,000
10. 90% of Item 9 for Provisions in Effect 6/30/80; 100% of Item 11 for Subsequent Amendments	\$ 293,389,000	\$ 1,769,000	\$ 81,000	\$ 295,239,000
11. State Contribution Requirement: Item 10 Adjusted with Interest for Payment Quarterly in Advance	\$ 302,425,000	\$ 1,823,000	\$ 83,000	\$ 304,331,000

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
PROJECTED CONTRIBUTIONS BASED ON THE JUNE 30, 1989 VALUATION

The following tables contain projections of the State contribution requirements under three alternative assumptions regarding the future growth of teachers' salaries.

For the purpose of these illustrations, we have developed 40-year projections based on aggregate salary increases of 6%, 8%, and 10% per year, assuming the number of active teachers will remain at 40,258. Results shown for 1980-1989 (which correspond to contributions for fiscal years 1982 - 1991) are based on actual valuations of the System. Results shown for the projection period from 1990 to 2029 (which correspond to contributions for fiscal years from 1992 to 2031) are based on estimates of future results.

Each line of the tables contains the normal cost and unfunded actuarial accrued liability as of a particular valuation date followed by contribution information related to the appropriate fiscal year. The full contribution amount and the required contribution amount under PA 79-436 (as amended) are included both as a dollar figure and as a percentage of the historical or estimated future teachers' payroll, as applicable. For example, the June 30, 1986 valuation generated a normal cost of \$132,310,000 and an unfunded actuarial accrued liability of \$3,818,585,000. Together, those results were used in calculating both the full contribution of \$321,551,000 and the required contribution of \$241,563,000 for the fiscal year ending June 30, 1988. The above contribution requirements represent 26.9% and 20.2%, respectively, of the teachers' payroll of \$1,193,463,000 for the fiscal year ending June 30, 1987.

The following differences exist between the required contributions as recommended by the Board and as shown on the tables and the actual contribution amounts appropriated to the System:

<u>Fiscal Year</u> <u>Ending June 30,</u>	<u>Required</u> <u>Contribution</u>	<u>Actual</u> <u>Contribution</u>
1989	\$302,917,000	\$282,917,000
1990	\$348,639,000	\$321,639,000

For consistency with other numbers shown, the tables contain the required amounts but the projections take the actual amounts into consideration.

Table 1
STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

PROJECTED CONTRIBUTIONS BASED ON THE ACTUARIAL RESULTS AS OF JUNE 30, 1989
 (in thousands of dollars)

Teachers' Payroll is Assumed to Increase 6% per Annum Starting July 1, 1989

Actuarial Results as of June 30,		Contribution Amounts for the Fiscal Year Ending June 30,						
Norma	Unfunded Actuarial	Full	Percent of	Funding	Required	Percent of	Teachers' Payroll	
Cost	Accrued Liability	Contribution	Payroll	Percent	Contribution	Payroll	for Fiscal Year	
1980	\$61,032	\$1,818,569	29.6%	35%	\$75,927	10.3%	1980-81 7734,100	
1981	64,694	2,055,025	31.0%	40%	96,798	12.6%	1981-82 769,500	
1982	69,601	2,284,380	33.1%	45%	120,163	14.5%	1982-83 825,888	
1983	73,777	2,410,980	32.7%	50%	145,959	16.5%	1983-84 886,409	
1984	107,293	3,261,067	27.6%	65%	175,312	18.0%	1984-85 975,248	
1985	117,505	3,500,185	27.3%	70%	203,987	19.2%	1985-86 1,065,077	
1986	132,310	3,818,585	26.9%	75%	241,563	20.2%	1986-87 1,193,463	
1987	151,005	4,611,656	28.6%	80%	302,917	22.9%	1987-88 1,369,950	
1988	173,335	4,788,106	26.0%	85%	348,639	22.1%	1988-89 1,540,789	
1989	127,787	4,343,412	20.7%	90%	304,331	18.6%	1989-90 1,633,236	
1990	142,238	4,512,698	20.6%	95%	338,304	19.5%	1990-91 1,731,230	
1991	150,772	4,730,272	20.4%	100%	374,271	20.4%	1991-92 1,835,104	
1992	159,818	4,939,840	20.3%	100%	395,678	20.3%	1992-93 1,945,210	
1993	169,407	5,139,177	20.3%	100%	418,313	20.3%	1993-94 2,061,923	
1994	179,571	5,343,330	20.2%	100%	442,244	20.2%	1994-95 2,185,638	
1995	190,345	5,552,039	20.2%	100%	467,550	20.2%	1995-96 2,316,776	
1996	201,766	5,764,988	20.1%	100%	494,305	20.1%	1996-97 2,455,783	
1997	213,872	5,981,792	20.1%	100%	522,595	20.1%	1997-98 2,603,130	
2002	286,207	7,104,661	19.8%	100%	690,314	19.8%	2002-03 3,483,575	
2007	383,010	8,212,937	19.6%	100%	911,993	19.6%	2007-08 4,661,809	
2012	512,553	9,121,202	19.2%	100%	1,198,774	19.2%	2012-13 6,238,552	
2017	685,910	9,528,206	19.0%	100%	1,583,885	19.0%	2017-18 8,348,590	
2022	917,903	8,868,193	18.7%	100%	2,093,505	18.7%	2022-23 11,172,297	
2027	1,228,361	6,200,755	18.5%	100%	2,767,486	18.5%	2027-28 14,951,054	
2032	1,643,825	0	9.0%	100%	1,796,117	9.0%	2032-33 20,007,883	

Table 2
STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

Actual Approp
 1989 \$ 857,917,000
 1990 321,639,000

PROJECTED CONTRIBUTIONS BASED ON THE ACTUARIAL RESULTS AS OF JUNE 30, 1989
 (in thousands of dollars)

Teachers' Payroll is Assumed to Increase 8% per Annum Starting July 1, 1989

Actuarial Results as of June 30,		Contribution Amounts for the Fiscal Year Ending June 30,										
Normal Cost	Unfunded Actuarial Accrued Liability	Full Contribution	Percent of Payroll	Funding Percent	Required Contribution	Percent of Payroll	Teachers' Payroll for Fiscal Year					
1980	\$61,032	\$1,818,569	\$216,933	29.6%	35%	\$75,927	10.3%	1980-81	\$734,100			
1981	64,694	2,055,025	238,861	31.0%	40%	96,798	12.6%	1981-82	769,500			
1982	69,601	2,284,380	273,348	33.1%	45%	120,163	14.5%	1982-83	825,888			
1983	73,777	2,410,980	289,579	32.7%	50%	145,959	16.5%	1983-84	886,409			
1984	107,293	3,261,067	269,102	27.6%	65%	175,312	18.0%	1984-85	975,248			
1985	117,505	3,500,185	290,771	27.3%	70%	203,987	19.2%	1985-86	1,065,077			
1986	132,310	3,818,585	321,551	26.9%	75%	241,563	20.2%	1986-87	1,193,463			
1987	151,005	4,611,656	378,216	28.6%	80%	302,917	22.9%	1987-88	1,369,950			
1988	173,335	4,788,106	409,844	26.0%	85%	348,639	22.1%	1988-89	1,540,789			
1989	127,787	4,343,412	337,934	20.3%	90%	304,331	18.3%	1989-90	1,664,052			
1990	142,238	4,602,312	366,946	20.4%	95%	348,699	19.4%	1990-91	1,797,176			
1991	153,617	4,919,739	393,219	20.3%	100%	393,219	20.3%	1991-92	1,940,950			
1992	165,906	5,239,641	423,764	20.2%	100%	423,764	20.2%	1992-93	2,096,226			
1993	179,178	5,559,466	456,685	20.2%	100%	456,685	20.2%	1993-94	2,263,924			
1994	193,512	5,895,300	492,166	20.1%	100%	492,166	20.1%	1994-95	2,445,038			
1995	208,993	6,247,476	530,408	20.1%	100%	530,408	20.1%	1995-96	2,640,641			
1996	225,712	6,616,261	571,624	20.0%	100%	571,624	20.0%	1996-97	2,851,892			
1997	243,769	7,001,835	616,047	20.0%	100%	616,047	20.0%	1997-98	3,080,043			
2002	358,178	9,179,660	895,698	19.8%	100%	895,698	19.8%	2002-03	4,525,594			
2007	526,281	11,717,567	1,302,467	19.6%	100%	1,302,467	19.6%	2007-08	6,649,582			
2012	773,279	14,377,624	1,887,952	19.3%	100%	1,887,952	19.3%	2012-13	9,770,418			
2017	1,136,200	16,586,933	2,746,553	19.1%	100%	2,746,553	19.1%	2017-18	14,355,949			
2022	1,669,451	17,045,022	3,996,563	18.9%	100%	3,996,563	18.9%	2022-23	21,093,599			
2027	2,452,972	13,158,543	5,815,951	18.8%	100%	5,815,951	18.8%	2027-28	30,993,417			
2032	3,604,221	0	4,012,438	8.8%	100%	4,012,438	8.8%	2032-33	45,539,498			

Table 3

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

PROJECTED CONTRIBUTIONS BASED ON THE ACTUARIAL RESULTS AS OF JUNE 30, 1989
(in thousands of dollars)

Teachers' Payroll is Assumed to Increase 10% per Annum Starting July 1, 1989

Actuarial Results as of June 30,		Contribution Amounts for the Fiscal Year Ending June 30,						Teachers' Payroll	
Normal Cost	Unfunded Actuarial Accrued Liability	Full Contribution	Percent of Payroll	Funding Percent	Required Contribution	Percent of Payroll	for Fiscal Year		
1980	\$61,032	\$1,818,569	\$216,933	29.6%	35%	\$75,927	10.3%	1980-81	\$734,100
1981	64,694	2,055,025	238,861	31.0%	40%	96,798	12.6%	1981-82	769,500
1982	69,601	2,284,380	273,348	33.1%	45%	120,163	14.5%	1982-83	825,888
1983	73,777	2,410,980	289,579	32.7%	50%	145,959	16.5%	1983-84	886,409
1984	107,293	3,261,067	269,102	27.6%	65%	175,312	18.0%	1984-85	975,248
1985	117,505	3,500,185	290,771	27.3%	70%	203,987	19.2%	1985-86	1,065,077
1986	132,310	3,818,585	321,551	26.9%	75%	241,563	20.2%	1986-87	1,193,463
1987	151,005	4,611,656	378,216	28.6%	80%	302,917	22.9%	1987-88	1,369,950
1988	173,335	4,788,106	409,844	26.0%	85%	348,639	22.1%	1988-89	1,540,789
1989	127,787	4,343,412	337,934	19.9%	90%	304,331	18.0%	1989-90	1,694,868
1990	142,238	4,691,926	378,046	20.3%	95%	359,244	19.3%	1990-91	1,864,355
1991	156,462	5,112,952	412,791	20.1%	100%	412,791	20.1%	1991-92	2,050,791
1992	172,108	5,551,412	453,321	20.1%	100%	453,321	20.1%	1992-93	2,255,870
1993	189,319	6,005,184	497,836	20.1%	100%	497,836	20.1%	1993-94	2,481,457
1994	208,251	6,492,252	546,726	20.0%	100%	546,726	20.0%	1994-95	2,729,603
1995	229,076	7,014,475	600,425	20.0%	100%	600,425	20.0%	1995-96	3,002,563
1996	251,984	7,573,717	659,403	20.0%	100%	659,403	20.0%	1996-97	3,302,819
1997	277,182	8,171,822	724,180	19.9%	100%	724,180	19.9%	1997-98	3,633,101
2002	446,404	11,804,689	1,157,110	19.8%	100%	1,157,110	19.8%	2002-03	5,851,145
2007	718,937	16,607,449	1,849,179	19.6%	100%	1,849,179	19.6%	2007-08	9,423,328
2012	1,157,856	22,466,229	2,949,375	19.4%	100%	2,949,375	19.4%	2012-13	15,176,364
2017	1,864,740	28,566,020	4,716,168	19.3%	100%	4,716,168	19.3%	2017-18	24,441,686
2022	3,003,183	32,348,258	7,542,378	19.2%	100%	7,542,378	19.2%	2022-23	39,363,580
2027	4,836,656	27,518,640	12,062,705	19.0%	100%	12,062,705	19.0%	2027-28	63,395,439
2032	7,789,483	0	8,832,313	8.7%	100%	8,832,313	8.7%	2032-33	102,098,988

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
THE FUNDED STATUS OF THE SYSTEM

As noted in the Summary of Valuation Results, we have compared the market value of assets with the actuarial present value of accrued benefits to obtain one measure of how the System is meeting its obligation to fund benefits payable to its Members.

The actuarial present value of benefits (the liabilities under the System) was based on Members' service as of the valuation date and upon salary projected to retirement using the revised actuarial assumptions which are summarized in Exhibit 9. In attempting to compare the current results with those of prior years, it is crucial to keep in mind that the actuarial basis of the calculations has been changed. Therefore, the actuarial present value of benefits as of June 30, 1989 is not comparable to results from prior years. The increase in the funded ratio to 58.3% and the decrease of the unfunded ratio to 191.7% are primarily due to changes in the measurement scale (i.e., the actuarial assumptions).

Fiscal Year Ending June 30	Market Value of Assets	Actuarial Present Value of Benefits	Funded Ratio	Unfunded Actuarial Present Value of Benefits	Annual Compensation	Unfunded Ratio
1980	\$ 1,049,306,000	\$ 2,603,702,000	40.3%	\$ 1,554,396,000	\$ 692,547,000	224.4%
1982	1,154,963,000	3,244,804,000	35.6%	2,089,841,000	769,500,000	271.6%
1984	1,696,074,000	4,398,687,000	38.6%	2,702,613,000	886,409,000	304.9%
1985	2,157,914,000	4,882,540,000	44.2%	2,724,626,000	975,248,000	279.4%
1986	2,728,837,000	5,305,841,000	51.4%	2,577,004,000	1,065,077,000	242.0%
1987	3,188,223,000	6,293,712,000	50.7%	3,105,489,000	1,193,463,000	260.2%
1989	4,136,564,000	7,090,175,000	58.3%	2,953,611,000	1,540,789,000	191.7%

Analysis of the funded ratio over time indicates how the System is meeting its obligation to fund benefits. Generally, the greater this ratio, the stronger and more well-funded the System.

We have also compared the unfunded actuarial present value of accrued benefits with annual compensation to remove the effects of inflation and to aid in the analysis of the System's progress in accumulating sufficient assets to pay benefits when due. Generally, the smaller the unfunded percentage, the stronger the System.

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

RECONCILIATION OF THE MARKET VALUE OF ASSETS

A. Reconciliation

1.	Market Value of Assets as of July 1, 1988	\$3,422,467,000
2.	Contributions (from State and Members, including Health Insurance)	383,177,000
3.	Benefit Payments:	
	a. Pension Payments	(180,716,000)
	b. Refund of Member Contributions	(5,846,000)
	c. Survivorship Benefits	(3,008,000)
4.	Net Investment Income	<u>520,490,000</u>
5.	Market Value of Assets as of June 30, 1989	\$4,136,564,000

B. Net Rate of Return on Market Value of Assets 14.8%

STATE TEACHERS' RETIREMENT SYSTEM

DEVELOPMENT OF VALUATION ASSETS

In order to reduce potential volatility in the market value of the System's assets, a smoothing technique is used to develop an actuarial value of assets. This value is then used to determine the unfunded actuarial accrued liability.

To develop the actuarial value of assets as of June 30, 1989, the actuarial value of assets as of July 1, 1988 was increased by contributions to the System and reduced by benefit payments made to former Members and their Beneficiaries. These amounts were then adjusted with interest to the end of the year, using the expected rate of return on assets. Effective with the June 30, 1989 actuarial valuation, the expected rate of return is assumed to be the same as the discount rate used to determine costs and liabilities. The resulting figure represents the expected actuarial value of assets, provided the assumed rate of return will be realized.

The expected actuarial value of assets at year end was then compared with the market value of assets as of June 30, 1989 and 20% of the difference was recognized. The resulting value would have been further adjusted if it had been less than 80% or greater than 120% of the market value of assets.

1.	Actuarial Value of Assets as of July 1, 1988	\$ 3,009,196,000
2.	Contributions	383,177,000
3.	Benefit Payments	189,570,000
4.	Net Transactions: Item 2 - Item 3	193,607,000
5.	Expected Rate of Return	8.5%
6.	Expected Investment Return: Item 5 x (Item 1 + $\frac{1}{2}$ Item 4)	264,010,000
7.	Expected Actuarial Value of Assets as of June 30, 1989: Item 1 + Item 4 + Item 6	3,466,813,000
8.	Market Value of Assets as of June 30, 1989	4,136,564,000
9.	Adjustments: 20% of the Difference between Item 8 and Item 7	133,950,000
10.	Preliminary Actuarial Value of Assets as of June 30, 1989: Item 7 + Item 9	3,600,763,000
11.	Limiting Values:	
	a. 80% of Item 8	3,309,251,000
	b. 120% of Item 8	4,963,877,000
12.	Actuarial Value of Assets as of June 30, 1989: Item 10, but not less than Item 11.a. or greater than Item 11.b.	\$ 3,600,763,000

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
CENSUS DATA FOR MEMBERS IN THE SYSTEM

For the purposes of the June 30, 1989 actuarial valuation of the Connecticut State Teachers' Retirement System, we were provided with census data on each active teacher who was in the System as of the valuation date. The data included name, sex, date of birth, service, salary, and the Member's contributions. Pertinent data was also provided for each retiree, beneficiary, survivor, and dependent as of June 30, 1989, including name, sex, date of birth, date of retirement, amount and form of monthly benefit, and beneficiary information, where applicable. In addition, we received data on former teachers who were no longer active in the System.

The table below gives a comparison of certain characteristics of Members in the System between this year and the previous valuation.

	<u>June 30, 1987</u>	<u>June 30, 1989</u>
1. Active Teachers		
a. Number	39,014	40,258
b. Average Age	43.4	44.1
c. Average Service	14.3	14.6
d. Average Annual Compensation	\$ 30,590	\$ 38,273
2. Terminated Vested Teachers		
a. Number	766	721
b. Average Monthly Deferred Benefit	\$ 469	\$ 469
3. Survivors and Dependents		
a. Number	485	504
b. Average Monthly Benefit	\$ 259	\$ 266
4. Retired Teachers and Beneficiaries		
a. Number	12,207	13,164
b. Average Monthly Benefit	\$ 1,099	\$ 1,267

The table below gives further details on the Retired Teachers and Beneficiaries as of June 30, 1989.

<u>Age</u>	<u>Number</u>	<u>Avg. Mo. Benefit</u>
Under 50	52	\$ 973
50 - 54	154	1,098
55 - 59	823	1,414
60 - 64	2,590	1,471
65 - 69	2,618	1,361
70 - 74	2,199	1,216
75 - 79	1,947	1,145
80 - 84	1,598	1,132
85 - 89	832	1,055
90 -	<u>351</u>	<u>953</u>
	13,164	\$ 1,267

The charts on the following pages present various characteristics of the Active Members of the System.

The first 3 charts give a distribution of the Active Members by age and completed years of service as of the valuation date. Separate charts are included for males, females, and all Members combined. Charts 4 through 6 show the average salaries for each age and service category.

Chart 1

STATE OF CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1989
(MALES ONLY)

AGE FIRST BIRTHDAY AT VAL DATE	NUMBER OF ACTIVE MEMBERS COMPLETED YEARS OF SERVICE													Total								
	0	1	2	3	4	5	9	10	14	15	19	20	24		25	29	30	34	35	39	Over 39	
20 - 24	4	27	8	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41
25 - 29	14	71	93	65	54	55	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	353
30 - 34	17	77	79	75	88	349	152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	837
35 - 39	25	59	79	58	72	275	714	447	0	0	0	0	0	0	0	0	0	0	0	0	0	1729
40 - 44	25	45	72	54	50	207	409	1604	864	0	0	0	0	0	0	0	0	0	0	0	0	3330
45 - 49	10	32	23	24	35	93	120	466	1436	476	0	0	0	0	0	0	0	0	0	0	0	2715
50 - 54	3	12	18	10	13	33	50	141	389	946	262	0	0	0	0	0	0	0	0	0	0	1877
55 - 59	2	5	10	8	5	24	35	90	179	393	692	106	0	0	0	0	0	0	0	0	0	1549
60 - 61	0	2	1	1	0	10	8	19	54	57	121	77	0	0	0	0	0	0	0	0	0	350
62 - 64	0	1	1	0	3	1	4	22	40	31	72	81	13	0	0	0	0	0	0	0	0	269
65 - 69	0	0	0	0	0	2	3	14	15	17	24	37	19	0	0	0	0	0	0	0	0	131
70 & up	0	0	0	0	0	0	0	2	1	2	2	2	3	0	0	0	0	0	0	0	0	12
Total	100	331	384	296	321	1049	1496	2805	2978	1922	1173	303	35	0	0	0	0	0	0	0	0	13193

Chart 2

STATE OF CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1989
(FEMALES ONLY)

AGE NRST BIRTHDAY AT VAL DATE	NUMBER OF ACTIVE MEMBERS COMPLETED YEARS OF SERVICE													Total								
	0	1	2	3	4	5	9	10	14	15	19	20	24		25	29	30	34	35	39	Over 39	
20 - 24	45	181	79	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	309
25 - 29	66	350	454	376	319	333	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1898
30 - 34	45	238	259	248	256	1024	464	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2534
35 - 39	73	321	286	259	227	761	1651	1022	0	0	0	0	0	0	0	0	0	0	0	0	0	4600
40 - 44	77	358	370	357	356	910	764	2205	1105	1	0	0	0	0	0	0	0	0	0	0	0	6503
45 - 49	28	157	205	194	207	707	744	731	1185	388	0	0	0	0	0	0	0	0	0	0	0	4546
50 - 54	6	52	63	59	75	291	451	643	569	502	226	0	0	0	0	0	0	0	0	0	0	2937
55 - 59	5	25	32	31	23	122	235	503	571	329	308	83	0	0	0	0	0	0	0	0	0	2267
60 - 61	0	0	3	7	6	21	31	139	166	95	62	51	2	2	2	2	2	2	2	2	2	583
62 - 64	0	2	1	2	3	15	28	112	143	101	43	40	17	17	17	17	17	17	17	17	17	507
65 - 69	0	0	0	1	1	11	11	74	77	61	42	22	23	23	23	23	23	23	23	23	23	323
70 & up	1	0	0	0	0	0	4	8	9	19	5	5	7	7	7	7	7	7	7	7	7	58
Total	346	1684	1752	1538	1473	4195	4383	5437	3825	1496	686	201	49	49	49	49	49	49	49	49	49	27065

Chart 3

STATE OF CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1989
(ALL MEMBERS)

AGE NRST BIRTHDAY AT VAL DATE	NUMBER OF ACTIVE MEMBERS COMPLETED YEARS OF SERVICE																	Total				
	0	1	2	3	4	5	9	10	14	15	19	20	24	25	29	30	34		35	39	Over 39	
20 - 24	49	208	87	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	350
25 - 29	80	421	547	441	373	388	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2251
30 - 34	62	315	338	323	344	1373	616	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3371
35 - 39	98	380	365	317	299	1036	2365	1469	0	0	0	0	0	0	0	0	0	0	0	0	0	6329
40 - 44	102	403	442	411	406	1117	1173	3809	1969	1	0	0	0	0	0	0	0	0	0	0	0	9833
45 - 49	38	189	228	218	242	800	864	1197	2621	864	0	0	0	0	0	0	0	0	0	0	0	7261
50 - 54	9	64	81	69	88	324	501	784	958	1448	488	0	0	0	0	0	0	0	0	0	0	4814
55 - 59	7	30	42	39	28	146	270	593	750	722	1000	189	0	0	0	0	0	0	0	0	0	3816
60 - 61	0	2	4	8	6	31	39	158	220	152	183	128	2	0	0	0	0	0	0	0	0	933
62 - 64	0	3	2	2	6	16	32	134	183	132	115	121	30	0	0	0	0	0	0	0	0	776
65 - 69	0	0	0	1	1	13	14	88	92	78	66	59	42	0	0	0	0	0	0	0	0	454
70 & up	1	0	0	0	0	0	4	10	10	21	7	10	7	7	7	7	7	7	7	7	10	70
Total	446	2015	2136	1834	1794	5244	5879	8242	6803	3418	1859	504	84	84	84	84	84	84	84	84	84	40258

STATE OF CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1989
(FEMALES ONLY)

AGE NRST BIRTHDAY AT VAL DATE	AVERAGE ANNUAL SALARY													Total							
	COMPLETED YEARS OF SERVICE																				
	0	1	2	3	4	5	9	10	14	15	19	20	24	25	29	30	34	35	39	Over 39	
20 - 24	15033	22442	23872	24407	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21754
25 - 29	17282	23931	24878	25218	26076	27162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25109
30 - 34	16988	25575	26723	27003	27635	29331	32615	0	0	0	0	0	0	0	0	0	0	0	0	0	28695
35 - 39	18744	25863	28703	28929	30722	31585	35833	40721	0	0	0	0	0	0	0	0	0	0	0	0	34165
40 - 44	19101	26925	29291	29225	30725	32332	37931	42010	42891	44837	0	0	0	0	0	0	0	0	0	0	37182
45 - 49	18783	27667	29607	30783	31190	33642	38136	42367	43426	44187	0	0	0	0	0	0	0	0	0	0	38517
50 - 54	18581	26493	31396	31187	33466	34033	38661	42248	43187	44328	45043	0	0	0	0	0	0	0	0	0	40629
55 - 59	20237	28192	32759	34272	31652	34681	38931	42053	43597	42888	44145	46136	0	0	0	0	0	0	0	0	41732
60 - 61	0	0	39372	30479	24538	35027	38647	42160	43485	43472	42914	44354	42740	42245	43007	45982	45639	44254	45966	43368	43007
62 - 64	0	13196	26500	39418	36673	37085	38705	41411	43327	45213	44545	45639	45982	43007	45982	45639	44254	45966	43368	43007	43007
65 - 69	0	0	0	39855	47000	35282	39183	43763	42138	44443	44692	44254	45966	43007	45982	45639	44254	45966	43368	43007	43007
70 & up	5675	0	0	0	0	0	41672	41850	36396	44398	44618	41378	47161	42041	45982	45639	44254	45966	43368	43007	43007
Total	17818	25486	27619	28224	29398	31499	36758	41863	43218	43986	44392	45261	46010	36134	45982	45639	44254	45966	43368	43007	43007

STATE OF CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1989
(ALL MEMBERS)

AGE NRST BIRTHDAY AT VAL DATE	AVERAGE ANNUAL SALARY COMPLETED YEARS OF SERVICE													Total								
	0	1	2	3	4	5	9	10	14	15	19	20	24		25	29	30	34	35	39	Over 39	
20 - 24	14978	22402	23854	23366	24700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21744
25 - 29	17023	23704	24882	25223	25998	27052	31884	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25011
30 - 34	16268	25964	26803	26927	27861	29587	32919	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28902
35 - 39	19911	26656	29731	29310	31076	32203	36315	41236	0	0	0	0	0	0	0	0	0	0	0	0	0	34972
40 - 44	19863	28177	30423	30228	31635	33631	39180	42833	43780	44837	0	0	0	0	0	0	0	0	0	0	0	39156
45 - 49	20311	29214	30742	32265	32893	34831	39093	43456	44706	45805	0	0	0	0	0	0	0	0	0	0	0	41138
50 - 54	23331	30834	33177	33090	34164	35044	39443	42687	44192	46202	47131	0	0	0	0	0	0	0	0	0	0	42995
55 - 59	21153	29574	34077	35001	34085	35926	39774	42656	44360	44820	47400	48873	0	0	0	0	0	0	0	0	0	44112
60 - 61	0	44618	35409	31782	24538	35032	40499	42668	44361	44628	46088	48028	42740	44246	44669	44351	42527	46889	48361	48361	48361	38272
62 - 64	0	25131	39650	39418	36222	35250	39068	41864	44057	45281	46811	48433	50187	44669	44351	42527	46889	48361	48361	48361	48361	38272
65 - 69	0	0	0	39855	47000	35106	38912	43635	42868	44927	45922	46204	47675	44351	42527	46889	48361	48361	48361	48361	48361	38272
70 & up	5675	0	0	0	0	0	41672	41668	37191	44367	44894	43008	46889	42527	46889	48361	48361	48361	48361	48361	48361	38272
Total	18424	26228	28274	28739	29974	32154	37417	42604	44263	45663	47102	48159	48361	48361	48361	48361	48361	48361	48361	48361	48361	38272

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
OUTLINE OF THE PRINCIPAL PROVISIONS OF THE SYSTEM

Outlined below are the principal provisions of the System which were reflected in this valuation.

1. Covered Employees

Any teacher, principal, superintendent or supervisor engaged in service of public schools, plus professional employees at State schools of higher education if they choose to be covered.

2. Salary

Amount paid to a teacher as specified in a contract of employment excluding amounts paid for extra duty assignments, coaching, unused sick time, unused vacation or terminal pay.

3. Average Annual Salary

Average of annual salary received during three years of highest salary.

4. Credited Service

One month for each month of service as a teacher in Connecticut public schools, maximum 10 months for each school year. Ten months of credited service constitutes one year of Credited Service. Certain other types of teaching service, State employment, or war-time military service may be purchased at retirement, if the member pays one-half of the cost.

5. Normal Retirement

Eligibility: Age 60 and 20 years of Credited Service in Connecticut or 35 years of Credited Service including at least 25 years of service in Connecticut.

5. Normal Retirement - continued

Benefit: 2% times years of Credited Service times Average Annual Salary
(maximum percent is 75%)

plus

any additional amounts derived from 6th percent and voluntary contribu-
tions by the teacher.

Minimum Benefit: Effective January 1, 1988, Public Act 87-381 provides a
minimum monthly retirement benefit of \$800 to teachers who retire under
the Normal Retirement provisions and who complete at least 25 years of
full time Connecticut service at retirement.

6. Early Retirement

Eligibility: At any age after the completion of 25 years of Credited
Service including 20 years of Connecticut service or at or after age 55
and the completion of 20 years of Credited Service including 15 years of
Connecticut service, with the last 5 years in Connecticut.

Benefit: Reduced normal retirement benefit. The early retirement factors
currently in effect are 6% per year for the first five years by which
early retirement precedes the minimum normal retirement age and 4% per
year for the next five years by which early retirement precedes the mini-
mum normal retirement age.

7. Proratable Retirement

Eligibility: Age 60 and 10 years of Credited Service with the last 5
years in Connecticut.

Benefit: 2% less .1% for each year less than 20 years times years of
Credited Service in Connecticut plus 1% times years of additional Credited
Service times Average Annual Salary.

8. Disability Retirement

Eligibility: Disability prior to age 60 and after 5 years of Credited Service in Connecticut if not incurred in the performance of duty and without regard to service if incurred in the performance of duty.

Benefit: Lesser of:

- 3% times Credited Service to date of disability times Average Annual Salary;
- 1-2/3% times Credited Service projected to age 60 times Average Annual Salary;
- 50% times Average Annual Salary.

Not less than 15% times Average Annual Salary.

9. Termination of Employment

With less than 5 years of Credited Service: Return of 5% contributions with interest.

With 5 or more years of Credited Service: Return of 5% contributions with interest and 1% contributions without interest.

With 10 or more years of Credited Service: 100% vested. Member may elect return of all contributions plus interest on 5% contributions in lieu of vested benefit.

10. Pre-Retirement Death Benefits

A lump sum plus one of the following: survivor's benefit, return of all contributions with interest, surviving spouse's benefit, or automatic surviving spouse's benefit.

10. Pre-Retirement Death Benefits
(continued)

- Lump Sum: \$1,000 for the first 5 years of Connecticut service plus \$200 per year thereafter. Maximum benefit: \$2,000.
- Survivor's Benefit: \$300 per month to a surviving spouse or dependent former spouse (receiving child support), or to a dependent parent over age 65 if there is no surviving spouse, or dependent child, or to a legal guardian if there is no surviving spouse, dependent former spouse, or dependent parent. \$200 per month to a single dependent child under age 18 or over 18 if disabled. \$300 per month divided equally among two or more such children in a family.
- Accumulated contributions with interest plus dependent children's benefits as described in the "Survivor's Benefit" paragraph.
- Surviving Spouse's Benefit: the 50% co-participant option plus dependent children's benefits as described in the "Survivor's Benefit" paragraph.
- Automatic Surviving Spouse's Benefit: Prefiled co-participant option with the percent continued chosen from 33-1/3%, 50%, 66-2/3%, 75%, or 100%.

11. Form of Annuity

Normal: Partial Refund Option - 75% of total benefit is paid as a life annuity. If 25% of the benefits paid prior to death do not exceed the Member's 5% contributions plus interest frozen at the date of benefit commencement, the difference is paid to his beneficiary.

Optional Forms: 5-, 10-, 20-, or 25-year certain and life. 33-1/3%, 50%, 66-2/3%, 75%, or 100% co-participant annuity (if co-participant dies first, benefit reverts to unreduced amount).

12. Cost-of-Living Allowance

Pension benefit adjustments are made in accordance with increases in the Consumer Price Index, with a minimum of 3% and a maximum of 5% per annum.

13. Teachers' Required Contribution

Each teacher is required to contribute 6% of annual salary.

14. State Contribution

The State funds the balance of the liability for benefits with annual contributions (currently paid in installments at the beginning of each quarter) determined in accordance with Section 10-183(z) (which reflects Public Act 79-436 as amended).

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
SUMMARY OF ACTUARIAL ASSUMPTIONS AND
ACTUARIAL COST METHODS

The following is a summary of the revised actuarial assumptions and the actuarial cost methods used in this valuation of the State Teachers' Retirement System, as well as the prior assumptions and methods.

<u>A. Actuarial Assumptions</u>	<u>Prior Assumption</u>	<u>Revised Assumption</u>																				
1. Investment Return:	8.0% per annum, compounded annually.	8.5% per annum, compounded annually.																				
2. Mortality:	The Unisex Pension Table for 1984, set back five years in age for females.	No change.																				
3. Termination of Employment:	<table border="0"> <thead> <tr> <th style="text-align: center;"><u>Years of Service</u></th> <th style="text-align: center;"><u>Rate</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1-5</td> <td style="text-align: center;">10%</td> </tr> <tr> <td style="text-align: center;">6-10</td> <td style="text-align: center;">6%</td> </tr> <tr> <td style="text-align: center;">11-20</td> <td style="text-align: center;">1%</td> </tr> <tr> <td style="text-align: center;">21 and above</td> <td style="text-align: center;">1%</td> </tr> </tbody> </table>	<u>Years of Service</u>	<u>Rate</u>	1-5	10%	6-10	6%	11-20	1%	21 and above	1%	<table border="0"> <thead> <tr> <th style="text-align: center;"><u>Years of Service</u></th> <th style="text-align: center;"><u>Rate</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1-5</td> <td style="text-align: center;">9%</td> </tr> <tr> <td style="text-align: center;">6-10</td> <td style="text-align: center;">5%</td> </tr> <tr> <td style="text-align: center;">11-20</td> <td style="text-align: center;">2%</td> </tr> <tr> <td style="text-align: center;">21 and above</td> <td style="text-align: center;">1%</td> </tr> </tbody> </table>	<u>Years of Service</u>	<u>Rate</u>	1-5	9%	6-10	5%	11-20	2%	21 and above	1%
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Exhibit 9
(Continued)

	<u>Prior Assumption</u>	<u>Revised Assumption</u>																														
5. Cost of Living Increases:	Annual increases in pensions of 5% after retirement.	Annual increases in pensions of 4% after retirement.																														
6. Retirement Age:	Teachers will retire when first eligible for normal retirement benefits as follows: <ul style="list-style-type: none"> ● after 35 years of service if before age 60 ● at age 60 if after 20 years of service but before 35 years of service ● at 20 years of service if after age 60 but before age 70 ● at age 70 if after 10 years of service but before 20 years of service 	<table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: center;"><u>Age</u></th> <th style="text-align: center;"><u>Percent Expected to Retire</u></th> </tr> </thead> <tbody> <tr><td style="text-align: center;">55</td><td style="text-align: center;">1%</td></tr> <tr><td style="text-align: center;">56-59</td><td style="text-align: center;">5%</td></tr> <tr><td style="text-align: center;">60-64</td><td style="text-align: center;">15%</td></tr> <tr><td style="text-align: center;">65</td><td style="text-align: center;">20%</td></tr> <tr><td style="text-align: center;">66</td><td style="text-align: center;">24%</td></tr> <tr><td style="text-align: center;">67</td><td style="text-align: center;">28%</td></tr> <tr><td style="text-align: center;">68</td><td style="text-align: center;">32%</td></tr> <tr><td style="text-align: center;">69</td><td style="text-align: center;">36%</td></tr> <tr><td style="text-align: center;">70</td><td style="text-align: center;">40%</td></tr> <tr><td style="text-align: center;">71</td><td style="text-align: center;">52%</td></tr> <tr><td style="text-align: center;">72</td><td style="text-align: center;">64%</td></tr> <tr><td style="text-align: center;">73</td><td style="text-align: center;">76%</td></tr> <tr><td style="text-align: center;">74</td><td style="text-align: center;">88%</td></tr> <tr><td style="text-align: center;">75</td><td style="text-align: center;">100%</td></tr> </tbody> </table>	<u>Age</u>	<u>Percent Expected to Retire</u>	55	1%	56-59	5%	60-64	15%	65	20%	66	24%	67	28%	68	32%	69	36%	70	40%	71	52%	72	64%	73	76%	74	88%	75	100%
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- if active and currently eligible to retire on the valuation date under one of the age and service combinations cited above, the teacher is assumed to retire on the following June 30th.

B. Actuarial Cost Methods;
Asset Valuation Method

1. Actuarial Cost Methods:

Prior Method

The entry age actuarial cost method was used to determine liabilities related to the State contribution requirement.

The unit credit actuarial cost method was used to determine the actuarial present value of accrued benefits, which is used to measure the funded status of the System.

Revised Method

No change.

No change.

2. Valuation of Assets:

The valuation assets are updated with actual contributions and benefit payments, and with interest at a rate equal to the cost-of-living adjustment to Social Security benefits (as determined under prior law for June adjustments), plus three percentage points. This preliminary value is compared with the market value of assets and 20% of the difference is recognized. The actuarial value of assets is further adjusted if necessary to lie between 80% and 120% of the market value of assets. The starting value used with this technique is the market value of assets as of June 30, 1980.

The valuation assets are updated with actual contributions and benefit payments, and with interest at a rate equal to the valuation rate of 8.5%. This preliminary value is compared with the market value of assets and 20% of the difference is recognized. The actuarial value of assets is further adjusted if necessary to lie between 80% and 120% of the market value of assets. The starting value used with this technique is the market value of assets as of June 30, 1980.

STATE OF CONNECTICUT
 STATE TEACHERS' RETIREMENT SYSTEM
 ALTERNATIVE RESULTS UNDER THE
PROJECTED UNIT CREDIT ACTUARIAL COST METHOD

In response to a request by the co-chairpersons of the Appropriations Committee of the State Legislature, we have calculated the unfunded actuarial accrued liability and the normal cost as of June 30, 1989, as well as the State contribution requirement for the fiscal year ending June 30, 1991, under the projected unit credit actuarial cost method.

Following is a comparison of the results under the entry age actuarial cost method, which the Board has adopted to determine the State contribution requirement, with the results under the projected unit credit actuarial cost method:

	Results Under Entry Age <u>Cost Method</u>	Results Under Unit Credit <u>Cost Method</u>
A. Unfunded Actuarial Accrued Liability as of June 30, 1989		
1. Actuarial Accrued Liability	\$7,944,175,000	\$7,090,175,000
2. Actuarial Value of Assets	<u>3,600,763,000</u>	<u>3,600,763,000</u>
3. Unfunded Actuarial Accrued Liability	\$4,343,412,000	\$3,489,412,000
B. Normal Cost as of June 30, 1989		
1. Normal Cost	\$ 127,787,000	\$ 172,306,000
2. Annual Compensation of Active Teachers	1,540,789,000	1,540,789,000
3. Normal Cost as a Percent of Annual Compensation	8.3%	11.2%
C. State Contribution Requirement for the Fiscal Year Ending June 30, 1991		
	\$ 304,331,000	\$ 319,065,000

For reference, we have included a brief description of the entry age actuarial cost method and the projected unit credit actuarial cost method as Exhibits 11 and 12, respectively.

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

DESCRIPTION OF THE ENTRY AGE ACTUARIAL COST METHOD

The objective of this actuarial cost method, as applied to a pension plan with a pay-related formula, is to express the cost attributable to the current year's employment for each participant as a level percent of the participant's salary.

The expected pension benefit at normal retirement is determined for each participant based on projected service at normal retirement and on salary projected to normal retirement using the assumed salary progression.

Normal Cost (also called "Current Service Cost") - For each participant, a level percent called the "Normal Cost Rate" is calculated. The Normal Cost Rate is calculated so that if each year that percent of the participant's salary for the year were paid into the fund from the earliest time the participant would have been eligible to join the plan (hence, entry age) until his retirement or termination, the payments would accumulate with interest (at the assumed valuation rate) to an amount sufficient to pay all benefits under the plan for that participant.

A participant's Normal Cost for a given plan year is the product of his Normal Cost Rate and his salary for that plan year.

The Normal Cost for the plan is the sum of the Normal Costs for the individual participants.

Actuarial Accrued Liability (also called "Past Service Liability") - The Actuarial Accrued Liability is determined as the theoretical amount that would have accumulated in the fund had annual contributions equal to the Normal Cost been made in each year prior to the valuation date. (It does not represent the liability for benefits accrued as of the valuation date.)

The Actuarial Accrued Liability for the plan is the sum of the Actuarial Accrued Liabilities for the individual participants.

The Unfunded Actuarial Accrued Liability (Unfunded Past Service Liability) is the excess of the Actuarial Accrued Liability (Past Service Liability) over the value of the plan assets.

The calculation of the Normal Cost and the Actuarial Accrued Liability takes into account the time value of money (by discounting for interest), expected increases in compensation (through salary progression), and appropriate probabilities of disability, termination, retirement, and death.

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

DESCRIPTION OF THE PROJECTED UNIT CREDIT ACTUARIAL COST METHOD

Under this actuarial cost method, the cost attributable to past employment (i.e., prior to the valuation date) and to the current year's employment for each participant is determined by prorating the pension benefit expected to be paid upon normal retirement over all years of service.

The expected pension benefit at normal retirement is determined for each participant based on service as of the valuation date but on salary projected to normal retirement using the assumed salary progression.

Normal Cost (also called "Current Service Cost") - The Normal Cost is calculated as the actuarial present value as of the valuation date of the current year's portion of the employee's expected pension benefit. The current year's portion equals the expected pension benefit divided by the total number of years of the participant's service at normal retirement.

The Normal Cost for the plan is the sum of the Normal Costs for the individual participants.

Actuarial Accrued Liability (also called "Past Service Liability") - The Actuarial Accrued Liability is determined as the actuarial present value as of the valuation date of the past years' (i.e., prior to the valuation date) portion of the participant's expected pension benefit. The past years' portion is equal to the expected pension benefit times the ratio of the number of years between the participant's date of participation and the valuation date to the number of years between his date of participation and his normal retirement date.

The Actuarial Accrued Liability for the plan is the sum of the Actuarial Accrued Liabilities for the individual participants.

The Unfunded Actuarial Accrued Liability (Unfunded Past Service Liability) is the excess of the Actuarial Accrued Liability (Past Service Liability) over the value of plan assets.

The calculation of the Normal Cost and the Actuarial Accrued Liability takes into account the time value of money (by discounting for interest), expected increases in compensation (through salary progression), and appropriate probabilities of disability, termination, retirement, and death.