

*Teachers Retirement*

THE WYATT COMPANY  
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STATE OF CONNECTICUT  
STATE TEACHERS' RETIREMENT SYSTEM

REPORT ON THE  
ACTUARIAL VALUATION AS OF JUNE 30, 1987

January 13, 1988

THE *Wyatt* COMPANY

ACTUARIES AND CONSULTANTS

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January 13, 1988

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, 1987

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, 1987 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, 1989 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, 1987 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, 1987 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.
- Actuarial assumptions which, in the aggregate, are reasonably related to the past experience of the System and to expected future results.
- Actuarial methods and the provisions of the System which are summarized in this report.

State Teachers' Retirement Board  
January 13, 1988  
Page Two

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.

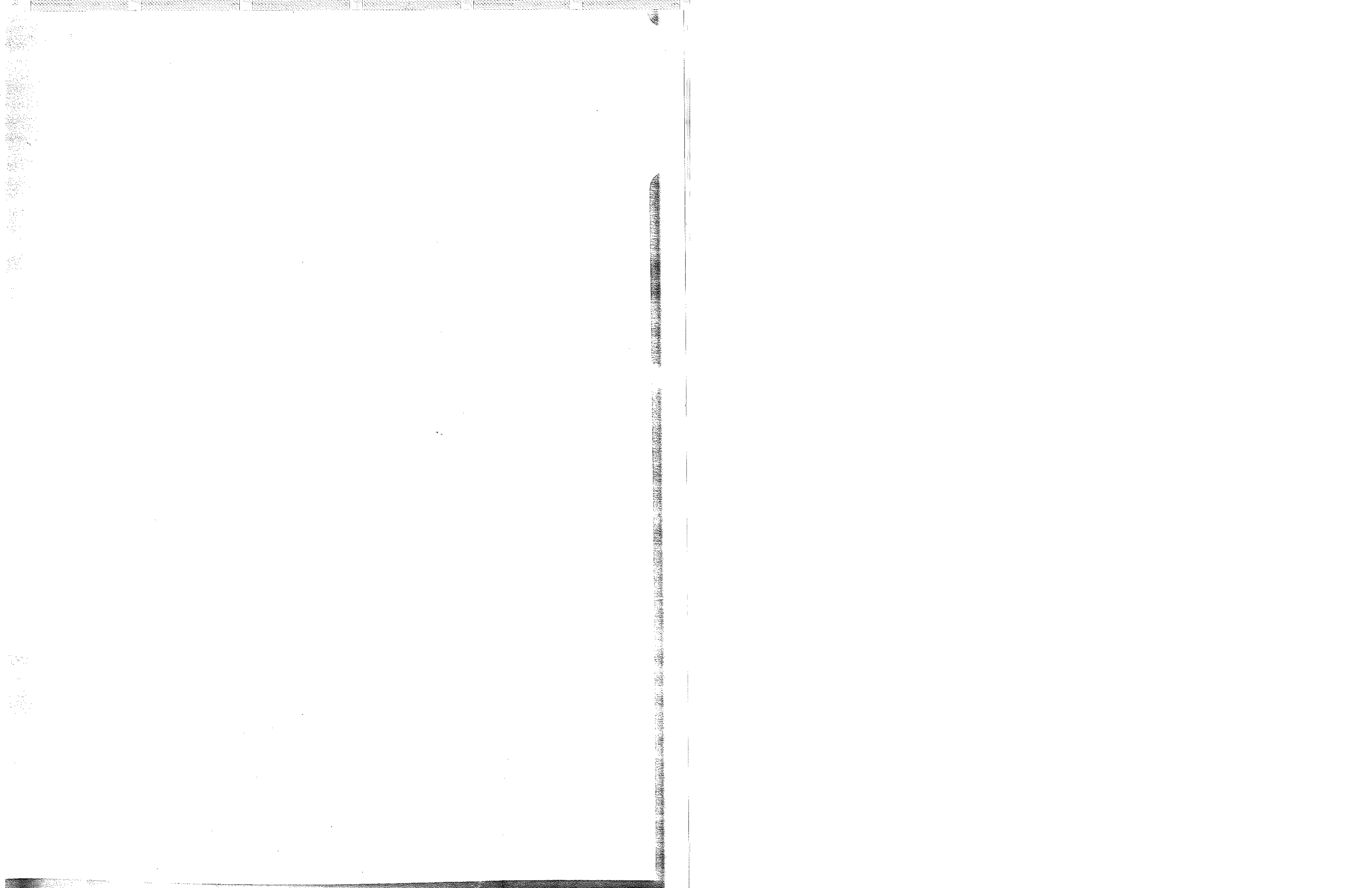
Respectfully submitted,

THE WYATT COMPANY

Brian F. Dunn  
Brian F. Dunn  
Associate, Society of Actuaries

Robert A. Rosati  
Robert A. Rosati  
Fellow, Society of Actuaries

BFD/RAR/JCC



STATE OF CONNECTICUT  
STATE TEACHERS' RETIREMENT SYSTEM

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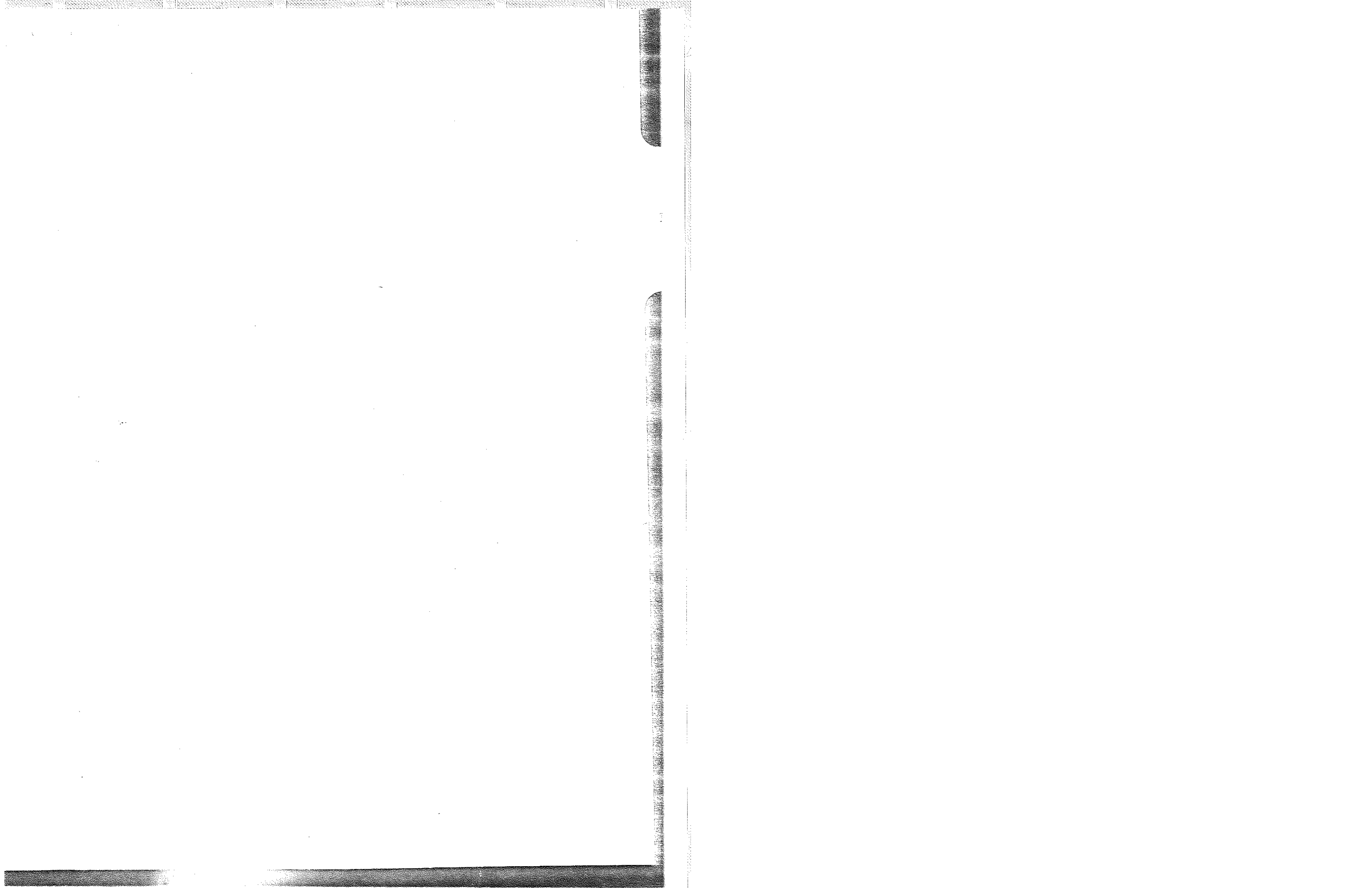
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STATE OF CONNECTICUT  
STATE TEACHERS' RETIREMENT SYSTEM

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, 1987;
- Compare these results with those of the prior year;
- 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, 1989; and
- Provide information about the financial status of the System, including a measure of the extent to which benefits have been funded.

This report includes analysis and commentary on the valuation results.

The introduction of this document presents a summary of the principal results of the June 30, 1987 actuarial valuation, including the State contribution requirement for the fiscal year ending June 30, 1989 and the funded status of the System as of June 30, 1987. A comparison of these results with the prior year's results is also included.

Exhibit 1 shows the determination of the unfunded actuarial accrued liability, the normal cost for the year and the development of the actuarial gain (loss). In Exhibit 2, we develop the State contribution requirement for the fiscal year ending June 30, 1989 in accordance with Public Act 79-436 (as amended).

It should be noted that the member census data as of June 30, 1987 reflects the first of three years of salary increases attributable to the Education Enhancement Act. Exhibit 3 incorporates the initial impact of the Education Enhancement Act in three sets of projections of the State's future contribution requirements.

Exhibit 4 is a review of the funded status of the System.

Exhibit 5 consists of a reconciliation of the market value of assets from July 1, 1986 to June 30, 1987. In Exhibit 6 we develop the actuarial value of assets to be used in determining the State's contribution requirement.

In Exhibit 7 and the accompanying charts and graphs, we present information regarding the census data for the Members of the System, including a comparison of the current population with that of prior years.

This report concludes with an outline of the principal provisions of the System, in Exhibit 8, and a summary of the actuarial assumptions and cost method used in this valuation, in Exhibit 9.



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

*5/5/89, 10/10/89  
Enhancement 3/7*

A. Contribution Requirement

The State contribution requirement for the fiscal year ending June 30, 1989 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, 1988, and an estimate of the July 1, 1988 normal cost.

Contribution Requirement for the  
Fiscal Year Ending June 30, 1989                                   \$ 302,917,000

A detailed development of this contribution requirement is included as Exhibit 2.

B. Funded Status of the System

The funded status of the System as of June 30, 1987 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 actuarial assumptions.

1. Actuarial Present Values for:

a. Retired Teachers, Beneficiaries Survivors, Dependents, and Other Inactive Teachers	\$ 1,821,695,000
b. Active Teachers	3,450,354,000
c. Member Contributions	<u>1,021,663,000</u>
d. Total	\$ 6,293,712,000

*1,021,663,000*

2. Market Value of Assets                                   \$ 3,188,223,000

3. Funded Ratio: Item 2 ÷ Item 1.d.                                   50.7%

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

*Handwritten notes and signatures at the bottom of the page, including a signature that appears to be "John P. ...".*

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

A summary of the principal valuation results from the current valuation and last year's valuation follows.

Actuarial Valuation of the System  
as of  
June 30, 1986      June 30, 1987

A. SUMMARY OF DATA

1. Number of Members

a. Active	39,002	39,014
b. Inactive	854	968
c. Terminated Vested	779	766
d. Retired and Beneficiaries	11,302	12,207
e. Survivors and Dependents	504	485
f. Total	52,441	53,440

2. Characteristics of Active Members

a. Total Compensation	\$ 1,065,077,000	\$ 1,193,463,000
b. Average Annual Compensation	27,308	30,590
c. Average Age	43.3	43.4
d. Average Service	14.3	14.3

B. SUMMARY OF COSTS

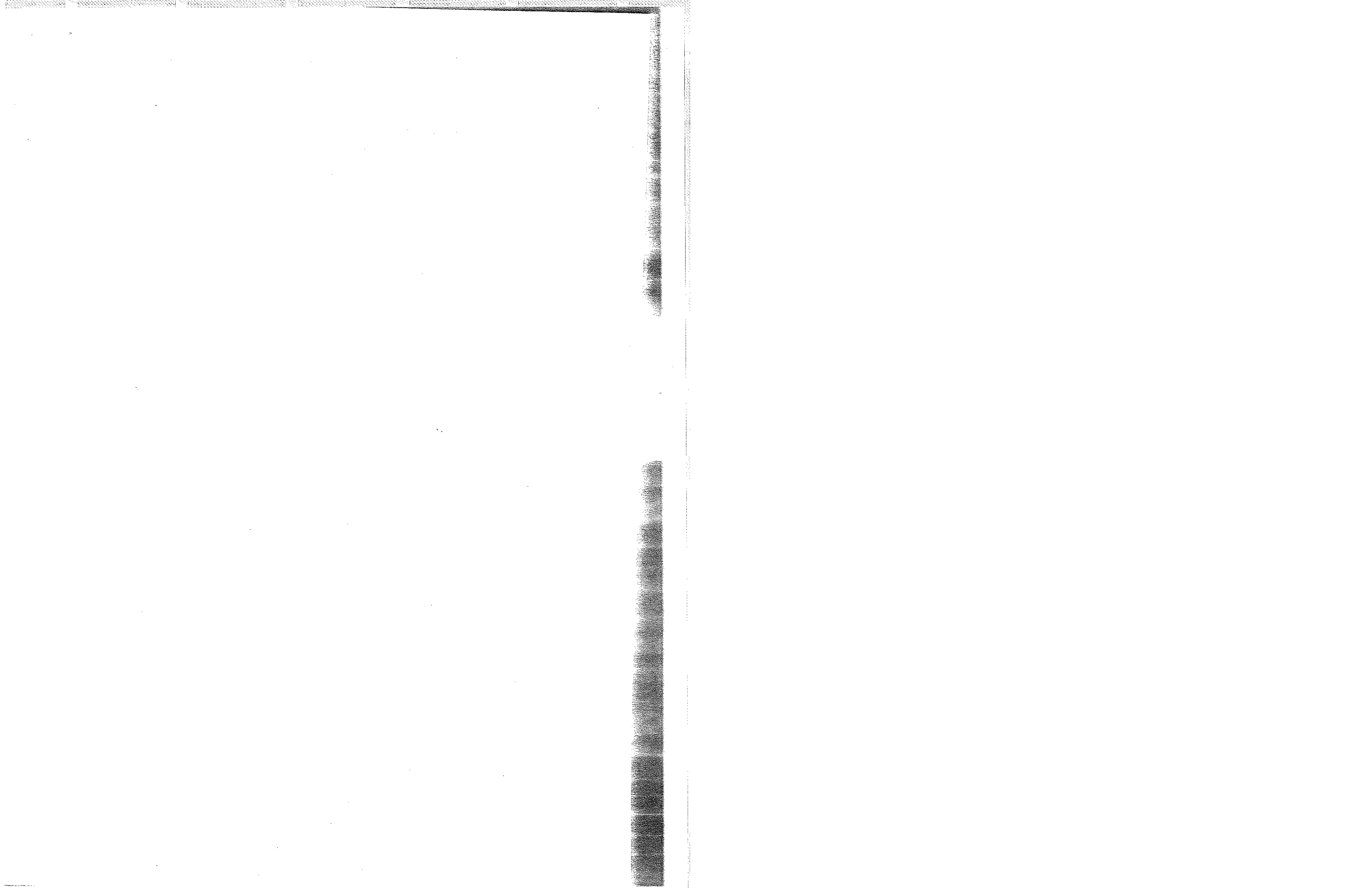
1. Normal Cost

a. Amount	\$ 132,310,000	\$ 151,005,000
b. As a Percent of Covered Compensation	12.4%	12.7%

2. Actuarial Accrued Liability	\$ 6,001,655,000	\$ 7,177,957,000
3. Valuation Assets	\$ 2,183,070,000	\$ 2,566,301,000
4. Unfunded Actuarial Accrued Liability	\$ 3,818,585,000	\$ 4,611,656,000
5. State Contribution Requirement for Fiscal Year Ending 6/30/88, 6/30/89, Respectively	\$ 241,563,000	\$ 302,917,000

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

	Actuarial Valuation of the System	
	as of	
	<u>June 30, 1986</u>	<u>June 30, 1987</u>
<b>C. <u>ASSETS AND ACTUARIAL PRESENT VALUES</u></b>		
1. Assets		
a. Actuarial Value	\$ 2,183,070,000	\$ 2,566,301,000
b. Market Value	\$ 2,728,837,000	\$ 3,188,223,000
2. Actuarial Present Value of Accrued Benefits		
a. Member Contributions	\$ 936,532,000	\$ 1,021,663,000
b. Retired Members Beneficiaries, Dependents, and Other Inactive Teachers	1,692,678,000	1,821,695,000
c. Other Members	<u>2,676,631,000</u>	<u>3,450,354,000</u>
d. Total	<u>\$ 5,305,841,000</u>	<u>\$ 6,293,712,000</u>



STATE OF CONNECTICUT

Exhibit 1

STATE TEACHERS' RETIREMENT SYSTEM

**DETERMINATION OF THE UNFUNDED ACTUARIAL ACCRUED LIABILITY,  
THE NORMAL COST AND THE ACTUARIAL GAIN (LOSS)**

*How much is state going to contribute?*

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	\$ 1,021,663,000
b. Active Teachers	4,334,599,000
c. Inactive Teachers	2,508,000
d. Terminated Vested Teachers	8,191,000
e. Retired Teachers and Beneficiaries	1,798,162,000
f. Survivors and Dependents	<u>12,834,000</u>
g. Total	\$ 7,177,957,000

*Sum of (1) + (2) + (3) + (4) + (5) + (6) = 7,177,957,000*

2. Actuarial Value of Assets

2,566,301,000

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

\$ 4,611,656,000

B. Normal Cost

1. Normal Cost as of July 1, 1987 \$ 151,005,000

2. Annual Compensation of Active Teachers 1,193,463,000

3. Normal Cost as a Percent of Annual Compensation 12.7%

Exhibit 1  
(Continued)

C. Determination of Experience Gain (Loss)

1. Unfunded Actuarial Accrued Liability as of 6/30/86	\$ 3,818,585,000
2. Normal Cost for the Year	132,310,000
3. Interest at 8% on Item 1 + Item 2	316,072,000
4. State Contribution for the Year	203,987,000
5. Interest at 8% on Item 4	<u>10,101,000</u>
6. Expected Unfunded Actuarial Accrued Liability as of 6/30/87: Item 1 + Item 2 + Item 3 - Item 4 - Item 5	\$ 4,052,879,000
7. Adjustment to Unfunded Actuarial Accrued Liability due to Teachers' Purchase of Credited Service at Retirement	1,231,000
8. Increase in Unfunded Actuarial Accrued Liability due to Public Act 87-381	1,506,000
9. Unfunded Actuarial Accrued Liability as of 6/30/87: Item A.3.	<u>4,611,656,000</u>
10. Actuarial Gain (Loss): Item 6 + Item 7 + Item 8 - Item 9	\$ (556,040,000)

*Handwritten notes:*  
 Increase due to P.A.  
 87-381  
 to take into account  
 the State's contribution

STATE OF CONNECTICUT  
STATE TEACHERS' RETIREMENT SYSTEM  
DEVELOPMENT OF THE STATE CONTRIBUTION REQUIREMENT  
FOR THE FISCAL YEAR ENDING JUNE 30, 1989

The State contribution requirement for the fiscal year ending June 30, 1989 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, 1988 and an estimate of the July 1, 1988 normal cost. This estimate was based on the July 1, 1987 normal cost and an estimate of future salary increases.

To develop the expected unfunded actuarial accrued liability as of June 30, 1988, the actual unfunded actuarial accrued liability as of June 30, 1987 was added to the normal cost as of July 1, 1987 and this sum was adjusted for one year's interest at the valuation rate of 8% per annum. This result was then reduced by the State's 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 amendment to the System resulting from Public Act 82-91 are developed separately. There was no normal cost associated with Public Act 82-91 because it affected only retired Members.

In addition, we have developed a separate expected unfunded actuarial accrued liability and contribution attributable to the amendment to the System resulting from Public Act 87-381. Since Public Act 87-381 affects only retired Members, there is no associated normal cost.

STATE OF CONNECTICUT  
STATE TEACHERS' RETIREMENT SYSTEM  
DEVELOPMENT OF THE STATE CONTRIBUTION REQUIREMENT FOR THE FISCAL YEAR ENDING JUNE 30, 1989

	Provisions in Effect June 30, 1980	Public Act 82-91	Public Act 87-381	Total
1. Unfunded Actuarial Accrued Liability as of 6/30/87	\$4,583,194,000	\$ 28,462,000	\$ 0	\$4,611,656,000
2. Normal Cost as of 7/1/87	151,005,000	0	0	151,005,000
3. Interest at 8% on (Item 1+Item 2)	378,736,000	2,277,000	0	381,013,000
4. State Contributions	(239,996,000)	(1,567,000)	0	(241,563,000)
5. Interest to End of Year on Item 4	<u>(11,884,000)</u>	<u>(78,000)</u>	<u>0</u>	<u>(11,962,000)</u>
6. Expected Unfunded Actuarial Accrued Liability as of 6/30/88	\$4,861,055,000	\$ 29,094,000	\$ 0	\$4,890,149,000
7. Increase in Unfunded Actuarial Accrued Liability due to PA 87-381	<u>0</u>	<u>0</u>	<u>1,506,000</u>	<u>1,506,000</u>
8. Expected Unfunded Actuarial Accrued Liability after Increase due to PA 87-381 (Item 6 + Item 7)	\$4,861,055,000	\$ 29,094,000	\$ 1,506,000	\$4,891,655,000
9. Level Percent Amortization Payment (40/25/30 Years)	199,764,000	1,599,000	73,000	201,436,000
10. Estimated Normal Cost as of 7/1/88	<u>166,106,000</u>	<u>0</u>	<u>0</u>	<u>166,106,000</u>
11. Total: Item 9 + Item 10	\$ 365,870,000	\$ 1,599,000	\$ 73,000	\$ 367,542,000
12. 80% of Item 11 for Provisions in Effect 6/30/80; 100% of Item 11 for Subsequent Amendments	\$ 292,696,000	\$ 1,599,000	\$ 73,000	\$ 294,368,000
13. State Contribution Requirement: Item 12 Adjusted with Interest for Payment Quarterly in Advance	\$ 301,197,000	\$ 1,645,000	\$ 75,000	\$ 302,917,000 ✓

THE *Optima* COMPANY



STATE OF CONNECTICUT  
STATE TEACHERS' RETIREMENT SYSTEM  
PROJECTED CONTRIBUTIONS BASED ON THE JUNE 30, 1987 VALUATION

The following tables contain projections of the State's 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 a 6%, 8%, and 10% annual rate of salary increase, assuming the number of active teachers will remain at 39,014. Results shown for 1980 - 1987 (which correspond to contributions for fiscal years 1982 - 1989) are based on actual valuations of the System. Results shown for the projection period from 1988 to 2027 (which correspond to contributions for fiscal years from 1990 to 2029) are based on estimates of future results.

Each line of the tables contains the normal cost and unfunded accrued actuarial 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% of the teachers' payroll of \$1,193,463,000 for the fiscal year ending June 30, 1988 respectively.



STATE OF CONNECTICUT  
STATE TEACHERS' RETIREMENT SYSTEM

Table 2

PROJECTED CONTRIBUTIONS BASED ON THE JUNE 30, 1987 VALUATION  
(in thousands of dollars)

Teachers' Payroll is Assumed to Increase 5% per Annum Starting July 1, 1988

Valuation Results as of June 30,	Normal Cost	Unfunded Actuarial Accrued Liability	Contribution Amounts for the Fiscal Year Ending June 30,					Percent of Payroll	
			Teachers' Payroll	Full Contribution	Percent of Payroll	Funding Percent	Required Contribution		
1980	\$61,032	\$1,818,569	1982	\$734,100	\$216,933	29.6%	35%	\$75,927	10.3%
1981	64,694	2,055,025	1983	769,500	238,861	31.0%	40%	96,798	12.6%
1982	69,601	2,284,380	1984	825,888	273,348	33.1%	45%	120,163	14.5%
1983	73,777	2,410,980	1985	886,409	289,579	32.7%	50%	145,959	16.5%
1984	107,293	3,261,067	1986	975,248	269,102	27.6%	65%	175,312	18.0%
1985	117,505	3,500,185	1987	1,065,077	290,771	27.3%	70%	203,987	19.2%
1986	132,310	3,818,585	1988	1,193,463	321,551	26.9%	75%	241,563	20.2%
1987	151,005	4,611,656	1989	1,324,744	378,216	28.6%	80%	302,917	22.9%
1988	166,106	4,891,655	1990	1,404,229	399,222	28.4%	85%	339,610	24.2%
1989	176,072	5,144,465	1991	1,488,483	420,530	28.3%	90%	378,667	25.4%
1990	186,636	5,389,753	1992	1,577,792	442,077	28.0%	95%	420,073	26.6%
1991	197,834	5,625,082	1993	1,672,460	463,791	27.7%	100%	463,791	27.7%
1992	209,704	5,847,875	1994	1,772,808	489,138	27.6%	100%	489,138	27.6%
1993	222,286	6,055,427	1995	1,879,176	515,881	27.5%	100%	515,881	27.5%
1994	235,623	6,266,570	1996	1,991,927	544,100	27.3%	100%	544,100	27.3%
1995	249,760	6,480,941	1997	2,111,443	573,876	27.2%	100%	573,876	27.2%
1996	264,746	6,698,115	1998	2,238,130	605,294	27.0%	100%	605,294	27.0%
1997	280,631	6,917,597	1999	2,372,418	638,447	26.9%	100%	638,447	26.9%
2002	375,547	8,026,640	2004	3,174,830	833,801	26.3%	100%	833,801	26.3%
2007	502,567	9,065,602	2009	4,248,639	1,089,540	25.6%	100%	1,089,540	25.6%
2012	672,548	9,838,433	2014	5,685,637	1,418,944	25.0%	100%	1,418,944	25.0%
2017	906,022	10,040,250	2019	7,608,665	1,856,091	24.4%	100%	1,856,091	24.4%
2022	1,204,431	9,128,145	2024	10,182,110	2,429,709	23.9%	100%	2,429,709	23.9%
2027	1,611,601	6,234,624	2029	13,625,960	3,182,379	23.4%	100%	3,182,379	23.4%
2032	2,156,954	0	2034	18,234,608	2,352,774	12.9%	100%	2,352,774	12.9%

THE *Wigall* COMPANY

STATE OF CONNECTICUT  
STATE TEACHERS' RETIREMENT SYSTEMPROJECTED CONTRIBUTIONS BASED ON THE JUNE 30, 1987 VALUATION  
(in thousands of dollars)

Teachers' Payroll is Assumed to Increase 8% per Annum Starting July 1, 1988

Valuation Results as of June 30.		Contribution Amounts for the Fiscal Year Ending June 30.					
Normal Cost	Unfunded Actuarial Accrued Liability	Teachers' Payroll	Full Contribution	Percent of Payroll	Funding Percent	Required Contribution	Percent of Payroll
1980	\$61,032	\$1,818,569	\$216,933	29.6%	35%	\$75,927	10.3%
1981	64,694	2,055,025	238,861	31.0%	40%	96,798	12.6%
1982	69,601	2,284,380	273,348	33.1%	45%	120,163	14.5%
1983	73,777	2,410,980	289,579	32.7%	50%	145,959	16.5%
1984	107,293	3,261,067	269,102	27.6%	65%	175,312	18.0%
1985	117,505	3,500,185	290,771	27.3%	70%	203,987	19.2%
1986	132,310	3,818,585	321,551	26.9%	75%	241,563	20.2%
1987	151,005	4,611,656	378,216	28.6%	80%	302,917	22.9%
1988	166,106	4,891,655	406,965	28.4%	85%	346,192	24.2%
1989	179,394	5,246,729	436,999	28.3%	90%	393,489	25.5%
1990	193,746	5,606,178	468,293	28.1%	95%	444,978	26.7%
1991	209,246	5,967,315	500,811	27.8%	100%	500,811	27.8%
1992	225,986	6,327,089	538,418	27.7%	100%	538,418	27.7%
1993	244,065	6,682,077	578,858	27.5%	100%	578,858	27.5%
1994	263,590	7,052,782	622,350	27.4%	100%	622,350	27.4%
1995	284,677	7,439,363	669,123	27.3%	100%	669,123	27.3%
1996	307,451	7,841,889	719,425	27.2%	100%	719,425	27.2%
1997	332,047	8,260,327	773,523	27.0%	100%	773,523	27.0%
2002	487,887	10,580,463	1,111,636	26.5%	100%	1,111,836	26.5%
2007	716,866	13,195,464	1,598,879	25.9%	100%	1,598,879	25.9%
2012	1,053,311	15,820,247	2,294,800	25.3%	100%	2,294,800	25.3%
2017	1,547,661	17,829,338	3,303,770	24.8%	100%	3,303,770	24.8%
2022	2,274,022	17,896,974	4,758,971	24.3%	100%	4,758,971	24.3%
2027	3,341,286	13,496,098	6,858,130	23.8%	100%	6,858,130	23.8%
2032	4,909,446	0	5,456,194	12.9%	100%	5,456,194	12.9%

THE

*Wigatt*

COMPANY

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. These results are especially meaningful when compared with those of prior years:

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%

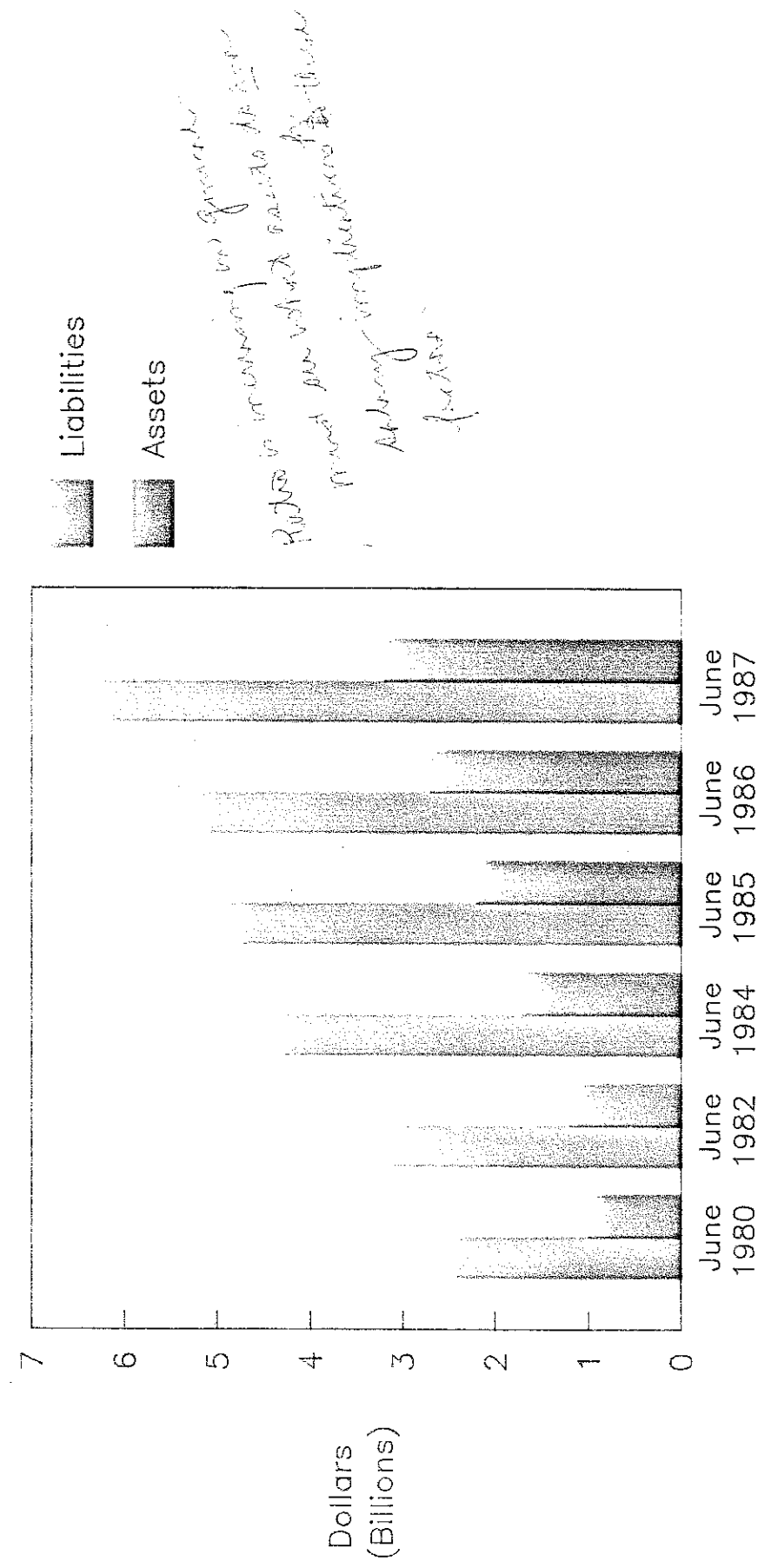
Analysis of the funded ratio over time indicates how the System is meeting its obligation to fund benefits. Generally, the greater this ratio, the stronger and more well-funded the System.

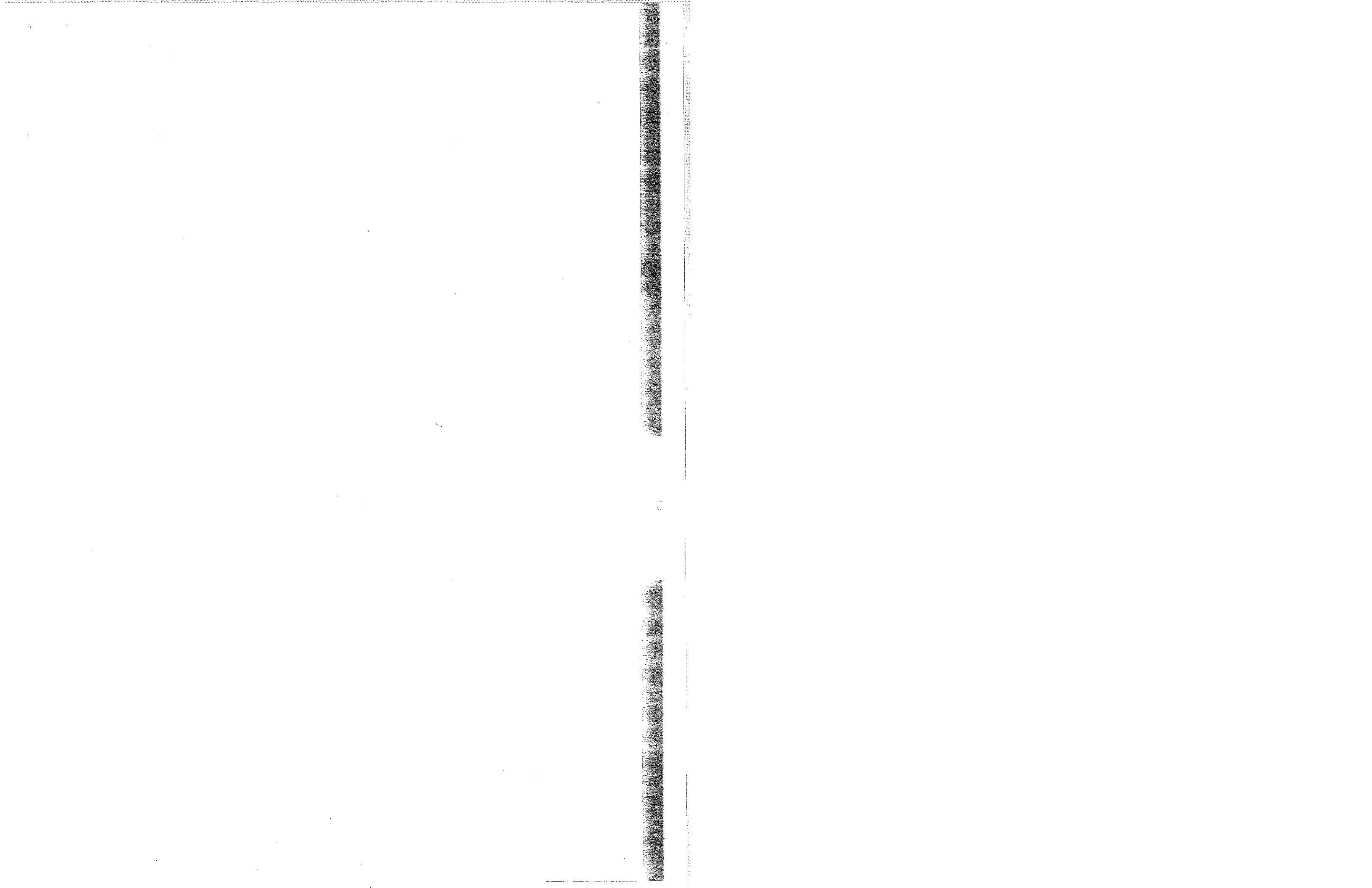
We have also compared the unfunded actuarial present value of accrued benefits with annual compensation to remove the effects of inflation and to aid in the analysis of the System's progress in accumulating sufficient assets to pay benefits when due. Generally, the smaller the unfunded percentage, the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

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 actuarial assumptions which are summarized in Exhibit 9. This historical progression is further illustrated in the graph on the following page.

Graph 1

# COMPARISON OF LIABILITIES AND ASSETS





STATE OF CONNECTICUT  
STATE TEACHERS' RETIREMENT SYSTEM

RECONCILIATION OF THE MARKET VALUE OF ASSETS

A. <u>Reconciliation</u>		
1.	Market Value of Assets as of July 1, 1986	\$2,728,837,000
2.	Contributions (from State and Members, including Health Insurance)	279,246,000
3.	Benefit Payments:	
a.	Pension Payments	(152,088,000)
b.	Refund of Member Contributions	(6,515,000)
c.	Survivorship Benefits	(2,752,000)
4.	Net Investment Income	<u>341,495,000</u>
5.	Market Value of Assets as of June 30, 1987	\$3,188,223,000
B.	<u>Net Rate of Return on Market Value of Assets</u>	12.2%
C.	<u>Change in CPI for Social Security</u> (First Quarter to First Quarter)	1.9%



## STATE TEACHERS' RETIREMENT SYSTEM

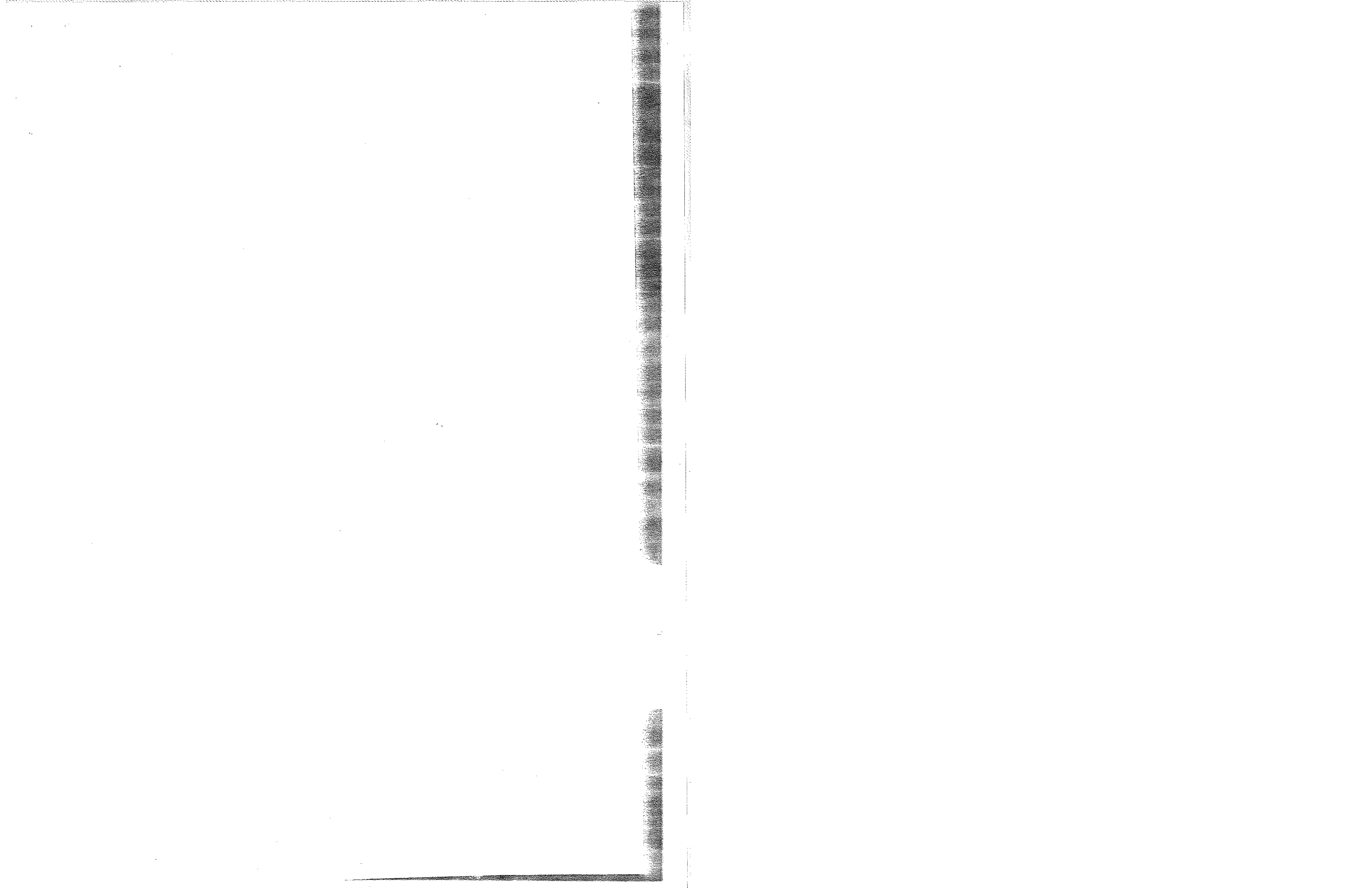
DEVELOPMENT OF VALUATION ASSETS

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, 1987, the actuarial value of assets as of July 1, 1986 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. 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, 1987 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, 1986	\$ 2,183,070,000
2.	Contributions	279,246,000
3.	Benefit Payments	161,355,000
4.	Net Transactions: Item 2 - Item 3	117,891,000
5.	Expected Rate of Return (Change in CPI + 3.0%)	4.9%
6.	Expected Investment Return: Item 5 x (Item 1 + $\frac{1}{2}$ Item 4)	109,859,000
7.	Expected Actuarial Value of Assets as of June 30, 1987: Item 1 + Item 4 + Item 6	2,410,820,000
8.	Market Value of Assets as of June 30, 1987	3,188,223,000
9.	Adjustments: 20% of the Difference between Item 8 and Item 7	155,481,000
10.	Preliminary Actuarial Value of Assets as of June 30, 1987: Item 7 + Item 9	2,566,301,000
11.	Limiting Values:	
a.	80% of Item 8	2,550,578,000
b.	120% of Item 8	3,825,868,000
12.	Actuarial Value of Assets as of June 30, 1987: Item 10, but not less than Item 11.a. or greater than Item 11.b.	\$ 2,566,301,000



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

For the purposes of the June 30, 1987 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, 1987, 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 last year.

	<u>June 30, 1986</u>	<u>June 30, 1987</u>
1. Active Teachers		
a. Number	39,002	39,014
b. Average Age	43.3	43.4
c. Average Service	14.3	14.3
d. Average Annual Compensation	\$ 27,308	\$ 30,590
2. Terminated Vested Teachers		
a. Number	779	766
b. Average Monthly Deferred Benefit	\$ 427	\$ 469
3. Survivors and Dependents		
a. Number	504	485
b. Average Monthly Benefit	\$ 257	\$ 259
4. Retired Teachers and Beneficiaries		
a. Number	11,302	12,207
b. Average Monthly Benefit	\$ 996	\$ 1,097
c. Average Monthly Benefit Inclusive of the \$800 Minimum Retirement Benefit under PA 87-381	--	\$ 1,099

Exhibit 7  
(Continued)

The table below gives certain characteristics of the Retired Teachers and Beneficiaries as of June 30, 1987.

<u>Age</u>	<u>Number</u>	<u>Avg. Mo. Benefit</u>	<u>Avg. Mo. Benefit Inclusive of \$800 Minimum</u>
Under 50	45	\$ 780	\$ 780
50 - 54	163	923	923
55 - 59	773	1,151	1,151
60 - 64	2,277	1,242	1,242
65 - 69	2,363	1,144	1,144 ←
70 - 74	2,138	1,082	1,082
75 - 79	2,025	1,044	1,045
80 - 84	1,441	1,029	1,031
85 - 89	639	935	942
90 -	343	815	844
	12,207	\$ 1,097	\$ 1,099

The charts and graphs 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.

The graphs on pages 25 through 28 compare the age and service distributions of the active population in the current valuations with those contained in the 1986 and 1980 valuations. These graphs are helpful in identifying trends in the age and service characteristics of the Members of the System.

STATE OF CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1987  
(MALES ONLY)

AGE NRST BIRTHDAY AT VAL DATE	AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1987 (MALES ONLY)										Total			
	0	1	2	3	4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29		30 - 34	35 - 39	Over 39
20 - 24	11	31	11	1	0	0	0	0	0	0	0	0	0	54
25 - 29	25	95	88	73	53	99	0	0	0	0	0	0	0	433
30 - 34	19	68	86	61	54	470	195	0	0	0	0	0	0	953
35 - 39	20	74	76	58	50	371	1018	636	0	0	0	0	0	2303
40 - 44	22	44	49	35	31	207	459	1881	629	0	0	0	0	3357
45 - 49	9	20	25	14	14	72	110	464	1197	376	0	0	0	2301
50 - 54	7	9	11	10	5	38	59	173	383	923	183	0	0	1801
55 - 59	3	6	5	5	8	26	38	113	179	434	664	73	0	1554
60 - 61	0	1	4	1	0	2	4	39	42	55	100	87	0	335
62 - 63	0	0	0	1	1	2	5	14	19	27	51	56	2	178
64 - 65	0	0	0	0	0	2	2	13	15	19	21	26	13	111
66 - 69	0	0	0	0	0	2	4	17	11	8	9	15	6	72
70 & up	0	0	0	0	0	0	0	1	1	1	3	4	1	10
Total	116	348	355	259	216	1291	1894	3350	2476	1843	1031	261	22	13462

THE OFFICE OF THE STATE COMPTROLLER

STATE OF CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1987  
(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	63	201	108	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	374
25 - 29	92	371	445	364	217	338	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1827
30 - 34	66	282	217	185	161	1390	524	0	0	0	0	0	0	0	0	0	0	0	0	0	2825
35 - 39	94	317	339	202	152	887	1970	1195	0	0	0	0	0	0	0	0	0	0	0	0	5156
40 - 44	88	343	322	251	173	808	748	2063	724	0	0	0	0	0	0	0	0	0	0	0	5520
45 - 49	57	135	161	109	94	605	624	698	798	290	0	0	0	0	0	0	0	0	0	0	3571
50 - 54	23	56	55	47	28	277	462	687	459	452	186	0	0	0	0	0	0	0	0	0	2732
55 - 59	6	18	20	22	18	114	237	620	499	293	282	84	0	0	0	0	0	0	0	0	2213
60 - 61	1	2	3	1	0	27	47	159	147	76	46	47	2	0	0	0	0	0	0	0	558
62 - 63	0	2	1	1	2	17	24	91	80	66	29	26	8	0	0	0	0	0	0	0	347
64 - 65	0	1	1	1	0	7	20	63	49	33	20	11	6	0	0	0	0	0	0	0	212
66 - 63	0	0	0	0	0	3	14	35	50	40	16	9	17	0	0	0	0	0	0	0	184
70 & up	0	0	0	1	0	1	2	5	5	7	7	1	4	0	0	0	0	0	0	0	33
Total	490	1728	1672	1186	845	4474	4672	5616	2811	1257	586	178	37	25552							

STATE OF CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1987  
(ALL MEMBERS)

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	74	232	119	3	0	0	0	0	0	0	0	0	0	0	428
25 - 29	117	466	533	437	270	437	0	0	0	0	0	0	0	0	2260
30 - 34	85	350	303	246	215	1860	719	0	0	0	0	0	0	0	3778
35 - 39	114	391	415	260	202	1258	2988	1831	0	0	0	0	0	0	7459
40 - 44	110	387	371	286	204	1015	1207	3944	1353	0	0	0	0	0	8877
45 - 49	66	155	186	123	108	677	734	1162	1995	666	0	0	0	0	5872
50 - 54	30	65	66	57	33	315	521	860	842	1375	369	0	0	0	4533
55 - 59	9	24	25	27	26	140	275	733	678	727	946	157	0	0	3767
60 - 61	1	3	7	2	0	29	51	198	189	131	146	134	2	2	893
62 - 63	0	2	1	2	3	19	29	105	99	93	80	82	10	10	525
64 - 65	0	1	1	1	0	9	22	76	64	52	41	37	19	19	323
66 - 69	0	0	0	0	0	5	18	52	61	48	25	24	23	23	256
70 & up	0	0	0	1	0	1	2	5	6	8	10	5	5	5	43
Total	606	2076	2027	1445	1061	5765	6566	8966	5287	3100	1617	439	59	59	39014

STATE OF CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1987  
(MALES ONLY)

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	14377	20113	19783	20908	0	0	0	0	0	0	0	0	0	0	18892
25 - 29	13407	19507	20306	20485	20839	21739	0	0	0	0	0	0	0	0	20155
30 - 34	14567	20486	21390	21851	22445	24202	27493	0	0	0	0	0	0	0	23914
35 - 39	22212	25227	24791	25703	25812	27641	30885	33718	0	0	0	0	0	0	30446
40 - 44	16551	28162	29839	34193	29815	32365	34246	35600	36453	0	0	0	0	0	35000
45 - 49	19057	34120	34178	36796	29039	35614	35167	36612	37134	30318	0	0	0	0	36900
50 - 54	16104	27301	32682	28494	35035	38868	36312	36931	37231	36771	39577	0	0	0	38020
55 - 59	18712	26801	35506	28904	31987	36000	35784	37831	37684	37721	39891	41632	0	0	38639
60 - 61	0	41951	33877	27995	0	25844	37052	35829	37456	37479	39652	42197	0	0	39025
62 - 63	0	0	0	23241	83689	30723	31710	37157	35955	39279	39296	40195	41847	0	38930
64 - 65	0	0	0	0	0	26237	38115	36872	41333	35837	38233	39182	40381	0	38338
66 - 69	0	0	0	0	0	29513	30694	35650	35141	38478	39485	38243	35582	0	36663
70 & up	0	0	0	0	0	0	0	0	35788	37951	40797	35171	45564	0	38238
Total	16542	23295	24556	25222	25244	27640	31889	35541	37643	38368	39748	41032	39441	0	34234

Official





STATE OF CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM

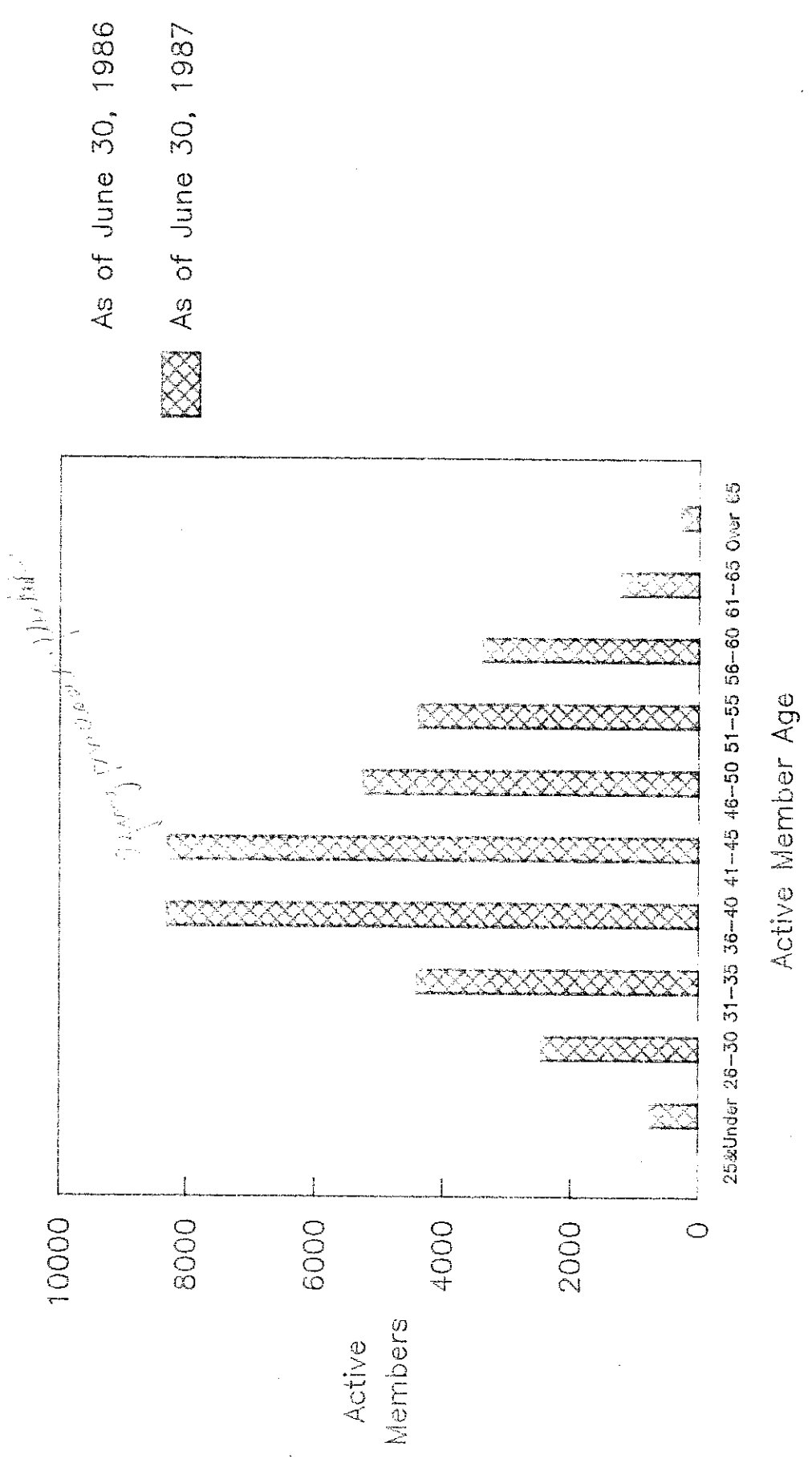
AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 1987  
(ALL MEMBERS)

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AGE NRST BIRTHDAY AT VAL DATE, AVERAGE ANNUAL SALARY, COMPLETED YEARS OF SERVICE

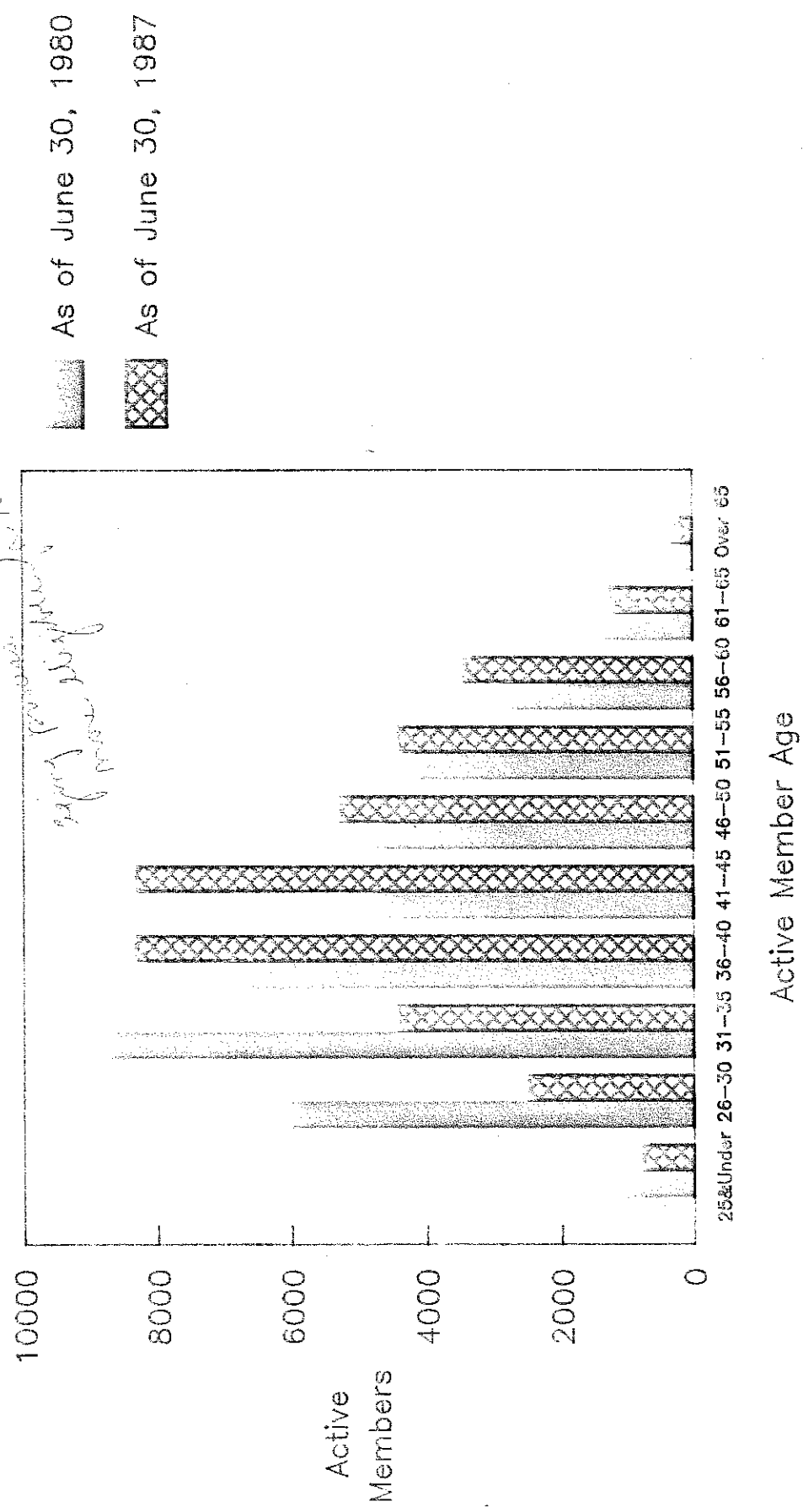
AGE NRST BIRTHDAY AT VAL DATE	0	1	2	3	4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	Over 39	Total
20 - 24	14118	19181	19650	21221	0	0	0	0	0	0	0	0	0	18450
25 - 29	14542	19763	20232	20583	20532	21468	0	0	0	0	0	0	0	20183
30 - 34	14734	20487	21684	21556	22045	23420	26325	0	0	0	0	0	0	23167
35 - 39	15712	21588	22820	23242	24246	25900	29641	33071	0	0	0	0	0	28468
40 - 44	15140	22425	23327	24315	23696	27543	31798	34613	35441	0	0	0	0	31721
45 - 49	16367	23794	24639	25854	25153	27546	31244	34878	36230	37187	0	0	0	33107
50 - 54	14452	24187	26241	24900	25315	29124	31092	34563	35593	37717	37816	0	0	34607
55 - 59	16499	23654	24885	23078	27872	28814	31879	34737	35511	36365	38547	38978	0	35588
60 - 61	11991	34054	31253	24616	0	27784	31226	34307	35431	36372	38388	40334	34201	35960
62 - 63	0	29663	20740	21621	50673	27949	31603	35235	34980	36558	37576	39078	37694	35948
64 - 65	0	27291	24913	16490	0	28416	34253	35329	36131	35755	36210	38884	38249	35866
66 - 69	0	0	0	0	0	27592	32979	34683	35229	35792	36857	37975	37218	35511
70 & up	0	0	0	23650	0	19619	28463	36462	33258	35186	34015	34852	38442	34187
Total	15065	21179	22209	22639	23038	25514	30108	34346	35767	37130	38204	39301	37632	30590

# DISTRIBUTION OF ACTIVE MEMBERS BY AGE 1986 & 1987 Comparison

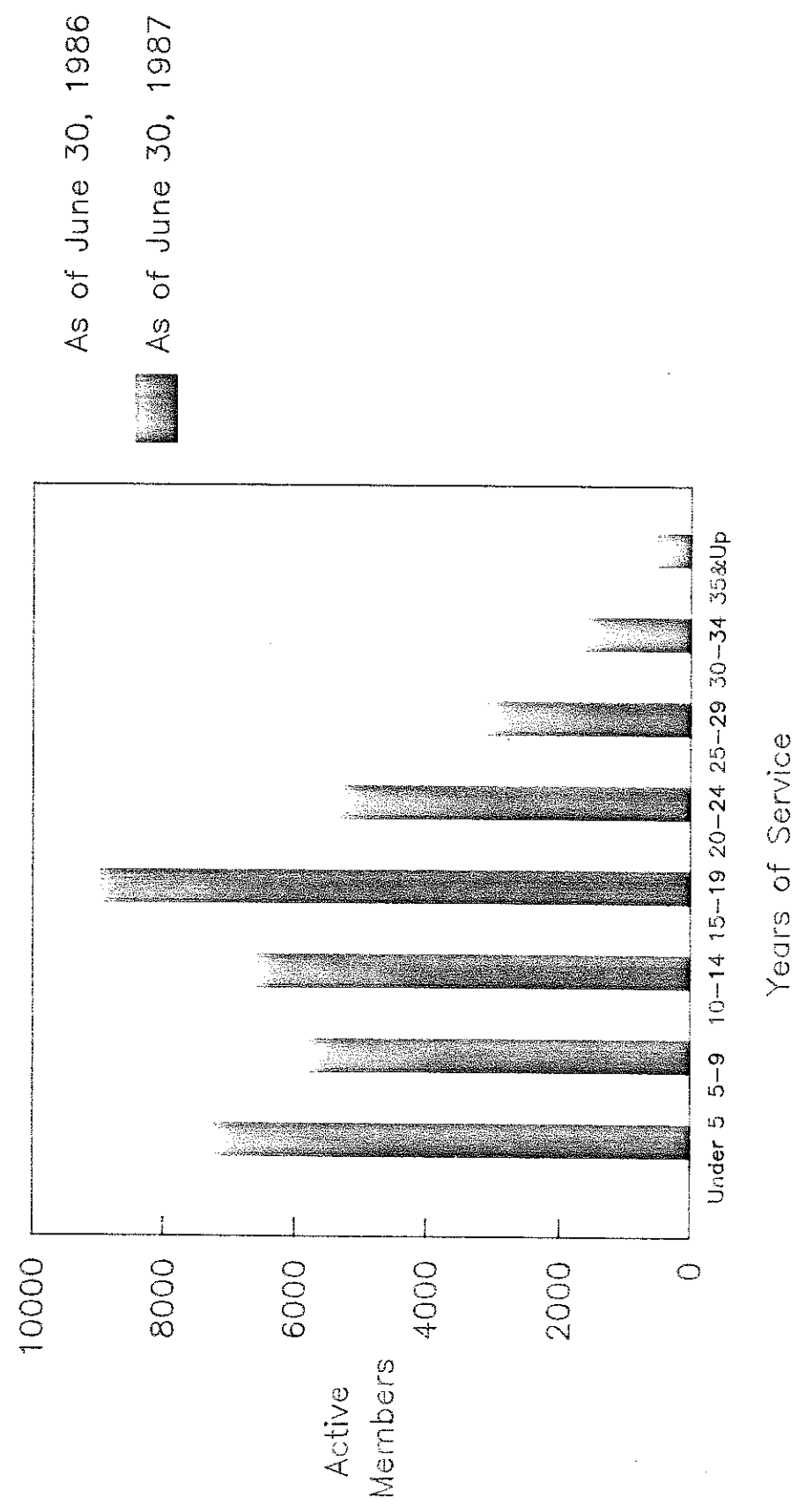


# DISTRIBUTION OF ACTIVE MEMBERS BY AGE

## 1980 & 1987 Comparison



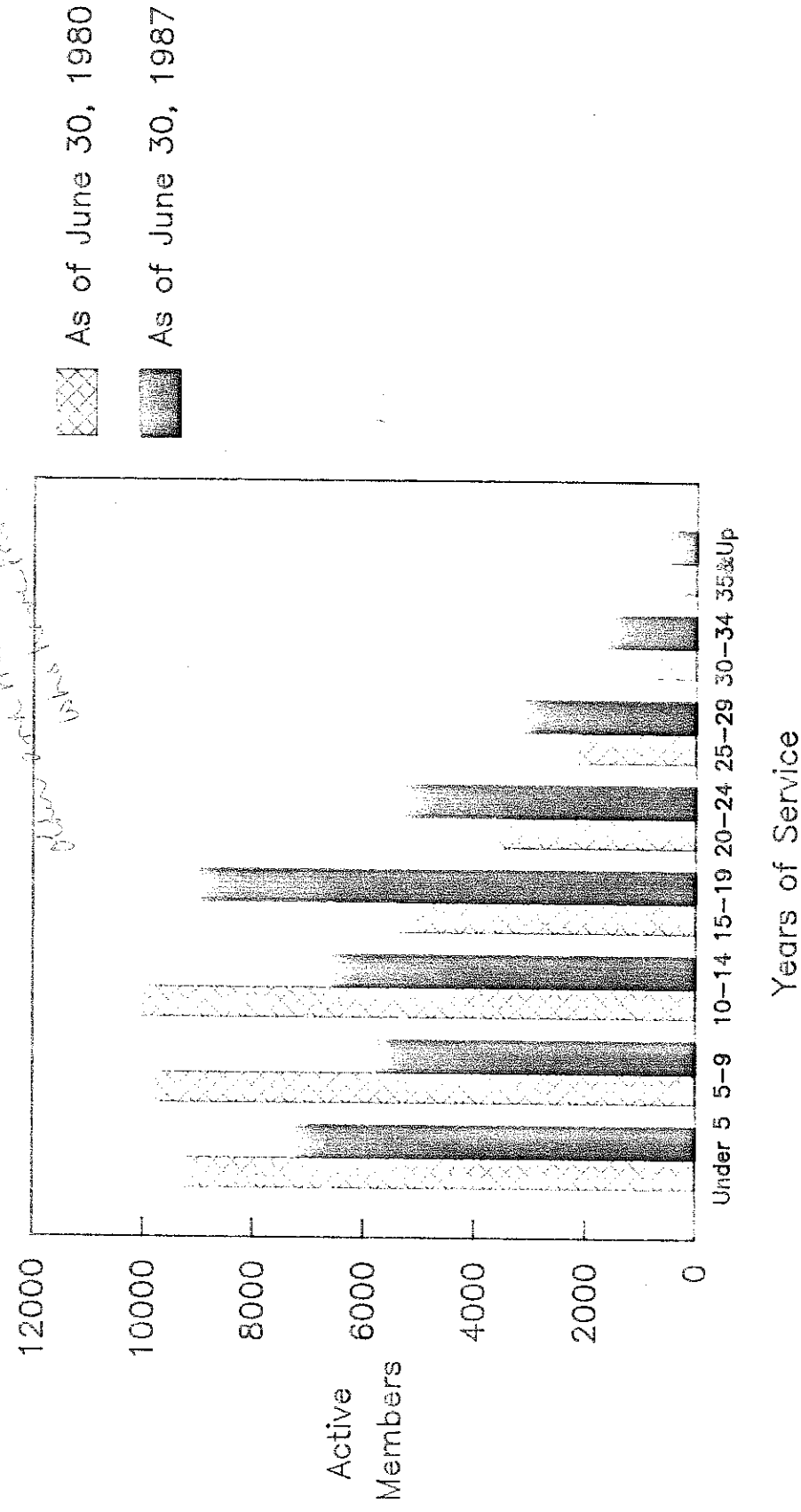
# DISTRIBUTION OF ACTIVE MEMBERS BY SERVICE 1986 & 1987 COMPARISON



# DISTRIBUTION OF ACTIVE MEMBERS BY SERVICE

## 1980 & 1987 COMPARISON

*show each member part for 1980*





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

*Resumption*

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 15 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).



SUMMARY OF ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

The following is a summary of the actuarial assumptions and the actuarial cost method used in this valuation of the State Teacher's Retirement System. These are the same assumptions and methods that were used in the prior year's valuation.

A. Actuarial Assumptions

1. Investment Return: 8% per annum, compounded annually.
2. Mortality: The Unisex Pension Table for 1984, set back five years in age for females.
3. Termination of Employment: Rates are based on prior System experience as follows:

<u>Years of Service</u>	<u>Rate</u>
1 - 5	10%
6 - 10	6%
11 and over	1%

4. Salary Increases: Annual increases of 8% for first 15 years of service; annual increases of 5½% thereafter, plus an additional 2% for all years of service July 1, 1984 through June 30, 1988.
5. Cost-of-Living Increases: Annual increases of 5% in pensions after retirement.
6. Retirement Age: It is assumed that teachers will retire when first eligible for normal retirement benefits as follows:
  - after 35 years of service if before age 60
  - at age 60 if after 20 years of service and before 35 years of service
  - at 20 years of service if after age 60 and before age 70
  - at age 70 if after 10 years of service and before 20 years of service
  - 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.

7. Disability Incidence: Based on prior experience of System as follows:

<u>Age</u>	<u>Rate</u>
Age 30	.00059
Age 40	.00105
Age 50	.00262

8. Active Member Marriage Assumptions: 85% of all Members are married. Females are 3 years younger than their spouse, and have one child at age 25 and another at age 27.

9. Expenses: Paid directly by the State.

B. Actuarial Cost Method; Asset Valuation Method

1. Actuarial Cost Method: The entry age actuarial cost method was used to determine liabilities related to the State's 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.

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.