

THE WYATT COMPANY
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STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
DISCUSSION SUMMARY OF THE
ACTUARIAL VALUATION AS OF JUNE 30, 1986

January 14, 1987

THE *Wyatt* COMPANY

JAN 14 1987

EMPLOYEE BENEFITS
COMPENSATION PROGRAMS
EMPLOYEE COMMUNICATIONS
ADMINISTRATIVE SYSTEMS
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ACTUARIES AND CONSULTANTS
1351 WASHINGTON BOULEVARD
STAMFORD, CONNECTICUT 06902
(203) 356-1220
TELEX 6819297

OFFICES IN PRINCIPAL CITIES
AROUND THE WORLD

January 14, 1987

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, 1986

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, 1986 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, 1988 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, 1986 submitted by the Board. This data was not audited by us, but appears to be sufficient for the purposes of this report.
- Financial data as of June 30, 1986 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 experience of the System and to reasonable expectations and which represent our best estimate of anticipated experience under the System.

State Teachers' Retirement Board
January 14, 1987
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- Actuarial methods and the provisions of the System which are summarized in this report.

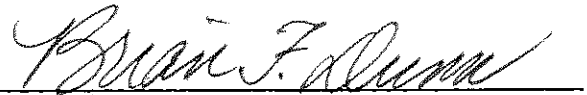
If, in connection with this actuarial valuation of the System, you have any other investigations which you would like us to conduct, or if any questions arise in connection with this report, we will be pleased to proceed according to your instructions.

Respectfully submitted,

THE WYATT COMPANY



Robert A. Rosati
Fellow, Society of Actuaries



Brian F. Dunn
Associate, Society of Actuaries

RAR/BFD/jcc

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

PURPOSE AND SCOPE

This discussion summary has been prepared by The Wyatt Company to:

- Summarize the principal results of the actuarial valuation of the State Teachers' Retirement System as of June 30, 1986;
- 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, 1988; and
- Provide information about the financial status of the System, including a measure of the extent to which benefits have been funded.

The full actuarial report will include detailed analysis and commentary on the valuation results.

Exhibit I of this document presents a summary of the principal results of the June 30, 1986 actuarial valuation, including the State contribution requirement for the fiscal year ending June 30, 1988. Exhibit II shows a comparison of these results with the prior year's results.

In Section I, we present information regarding the census data for the Members of the System, including a comparison of the current membership with that of prior years. Section II provides the development of the actuarial value of assets to be used in determining the State contribution requirement.

Section III shows the determination of the unfunded actuarial accrued liability and the normal cost for the year. In Section IV, we develop the State contribution requirement for the fiscal year ending June 30, 1988 in accordance with Public Act 79-436 (as amended).

Section V is a review of the funded status of the System.

This summary concludes with an outline of the principal provisions of the System in Exhibit III and summary of the actuarial assumptions and cost method used in this valuation in Exhibit IV.

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

SUMMARY OF ACTUARIAL VALUATION RESULTS AS OF JUNE 30, 1986

A. MEMBER DATA

1. Active Teachers

a. Number	39,002
b. Average Attained Age	43.3
c. Average Years of Service	15.9
d. Average Annual Compensation	\$ 27,308

2. Inactive Teachers

a. Number	854
b. Average Annual Deferred Benefit	\$ 4,610

3. Terminated Vested Teachers

a. Number	779
b. Average Annual Deferred Benefit	\$ 5,120

4. Retired Teachers and Beneficiaries

a. Number	11,302
b. Average Annual Benefit Payable	\$ 12,098

5. Survivors and Dependents

a. Number	504
b. Average Annual Benefit Payable	\$ 3,086

6. Total Number of Members 52,441

B. BASIC VALUATION RESULTS

1. Normal Cost as of July 1, 1986	\$ 132,310,000
2. Actuarial Accrued Liability as of June 30, 1986	
a. Member Contributions	\$ 936,532,000
b. Active Teachers	3,372,445,000
c. Inactive Teachers	(334,000)
d. Terminated Vested Teachers	1,623,000
e. Retired Teachers and Beneficiaries	1,678,301,000
f. Survivors and Dependents	13,088,000
g. Total	<u>\$ 6,001,655,000</u>

3.	Actuarial Value of Assets as of June 30, 1986	\$ 2,183,070,000
4.	Unfunded Actuarial Accrued Liability as of June 30, 1986	\$ 3,818,585,000
5.	State Contribution Requirement under Public Act 79-436 (as amended) for the Fiscal Year Ending June 30, 1988	\$ 241,563,000

C. ASSETS AND ACTUARIAL PRESENT VALUE OF ACCRUED
BENEFITS AS OF JULY 1, 1986

1.	Assets	
	a. Actuarial Value as of July 1, 1986	\$ 2,183,070,000
	b. Market Value as of July 1, 1986	\$ 2,728,837,000
2.	Actuarial Present Value of Accrued Benefits as of July 1, 1986	
	a. Member Contributions	\$ 936,532,000
	b. Retired Teachers, Beneficiaries, Survivors, Dependents, and Inactive Teachers	1,692,678,000
	c. Active Teachers	<u>2,676,631,000</u>
	d. Total	\$ 5,305,841,000

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

COMPARISON OF PRINCIPAL VALUATION RESULTS

		Actuarial Valuation of System as of	
		<u>June 30, 1985</u>	<u>June 30, 1986</u>
A. <u>SUMMARY OF DATA</u>			
1.	Number of Members		
	a. Active	39,085	39,002
	b. Inactive	N/A	854
	c. Terminated Vested	486	779
	d. Retired and Beneficiaries	11,411	11,302
	e. Survivors and Dependents	470	504
	f. Total	51,452	52,441
2.	Characteristics of Active Members		
	a. Total Compensation	\$ 975,248,000	\$ 1,065,077,000
	b. Average Annual Compensation	24,950	27,308
	c. Average Attained Age	43.9	43.3
	d. Average Service	14.0	15.9
B. <u>SUMMARY OF COSTS</u>			
1.	Normal Cost		
	a. Amount	\$ 117,505,000	\$ 132,310,000
	b. As a Percent of Covered Compensation	12.0%	12.4%
2.	Actuarial Accrued Liability	\$ 5,322,097,000	\$ 6,001,655,000
3.	Valuation Assets	\$ 1,821,912,000	\$ 2,183,070,000
4.	Unfunded Actuarial Accrued Liability	\$ 3,500,185,000	\$ 3,818,585,000
5.	State Contribution Requirement for Fiscal Year Ending 6/30/87, 6/30/88, Respectively	\$ 203,987,000	\$ 241,563,000

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

COMPARISON OF PRINCIPAL VALUATION RESULTS

		Actuarial Valuation of System as of	
		<u>June 30, 1985</u>	<u>June 30, 1986</u>
C. <u>ASSETS AND ACTUARIAL PRESENT VALUES</u>			
1.	Assets		
	a. Actuarial Value	\$ 1,821,912,000	\$ 2,183,070,000
	b. Market Value	\$ 2,157,914,000	\$ 2,728,837,000
2.	Actuarial Present Value of Vested Accrued Benefits		
	a. Member Contributions	\$ 822,900,000	\$ 936,532,000
	b. Retired Members and Beneficiaries	1,534,600,000	1,692,678,000
	c. Other Members	<u>2,525,000,000</u>	<u>2,676,631,000</u>
	d. Total	\$ <u>4,882,500,000</u>	\$ <u>5,305,841,000</u>

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

SECTION I - CENSUS DATA FOR MEMBERS IN THE SYSTEM

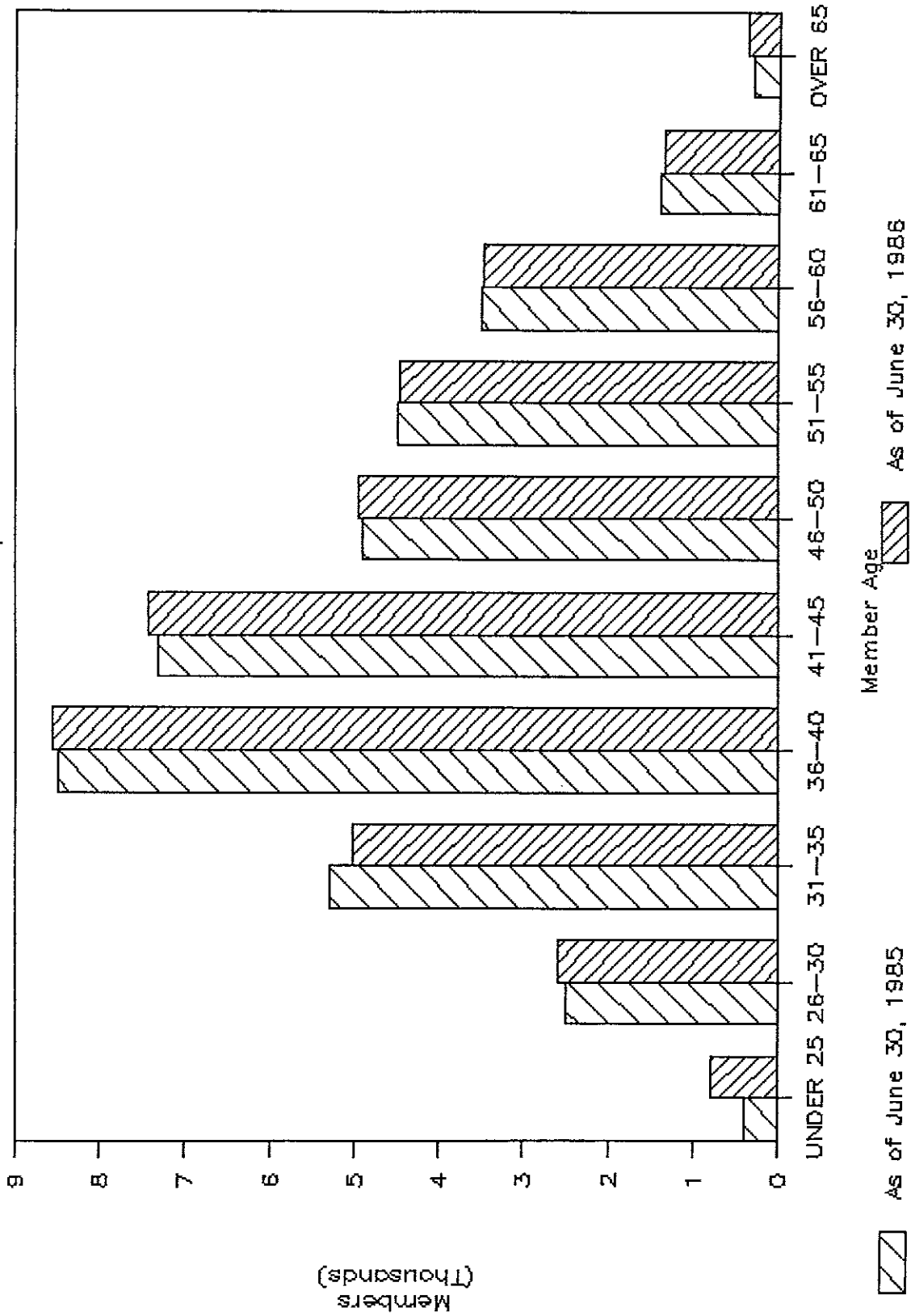
For the purposes of the June 30, 1986 actuarial valuation of the Connecticut State Teachers' Retirement System, we were provided with census data on each active teacher who was in the System as of the valuation date. The data included name, sex, date of birth, service, salary, and the Member's contributions. Pertinent data was also provided for each retiree, beneficiary, survivor, and dependent as of June 30, 1986, 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, 1985</u>	<u>June 30, 1986</u>		
1. Active Teachers				
a. Number	39,085	39,002		
b. Average Service	14.0	15.9		
c. Average Annual Compensation	\$ 24,950	\$ 27,308		
2. Terminated Vested Teachers				
a. Number	486	779		
b. Average Monthly Deferred Benefit	\$ 364	\$ 427		
3. Survivors and Dependents				
a. Number	470	504		
b. Average Monthly Benefit	\$ 284	\$ 257		
4. Retired Teachers and Beneficiaries:				
<u>Age</u>	<u>Number</u>	<u>Avg. Mo. Benefit</u>	<u>Number</u>	<u>Avg. Mo. Benefit</u>
Under 50	51	\$ 737	40	\$ 676
50-54	152	803	123	800
55-59	712	1,045	594	967
60-64	1,900	1,115	1,952	1,115
65-69	2,137	1,019	2,177	1,028
70-74	2,138	989	2,135	1,003
75-79	1,919	988	1,994	973
80-84	1,239	930	1,368	950
85-89	867	836	568	862
90-	296	751	351	752
	<u>11,411</u>	<u>\$ 991</u>	<u>11,302</u>	<u>\$ 996</u>

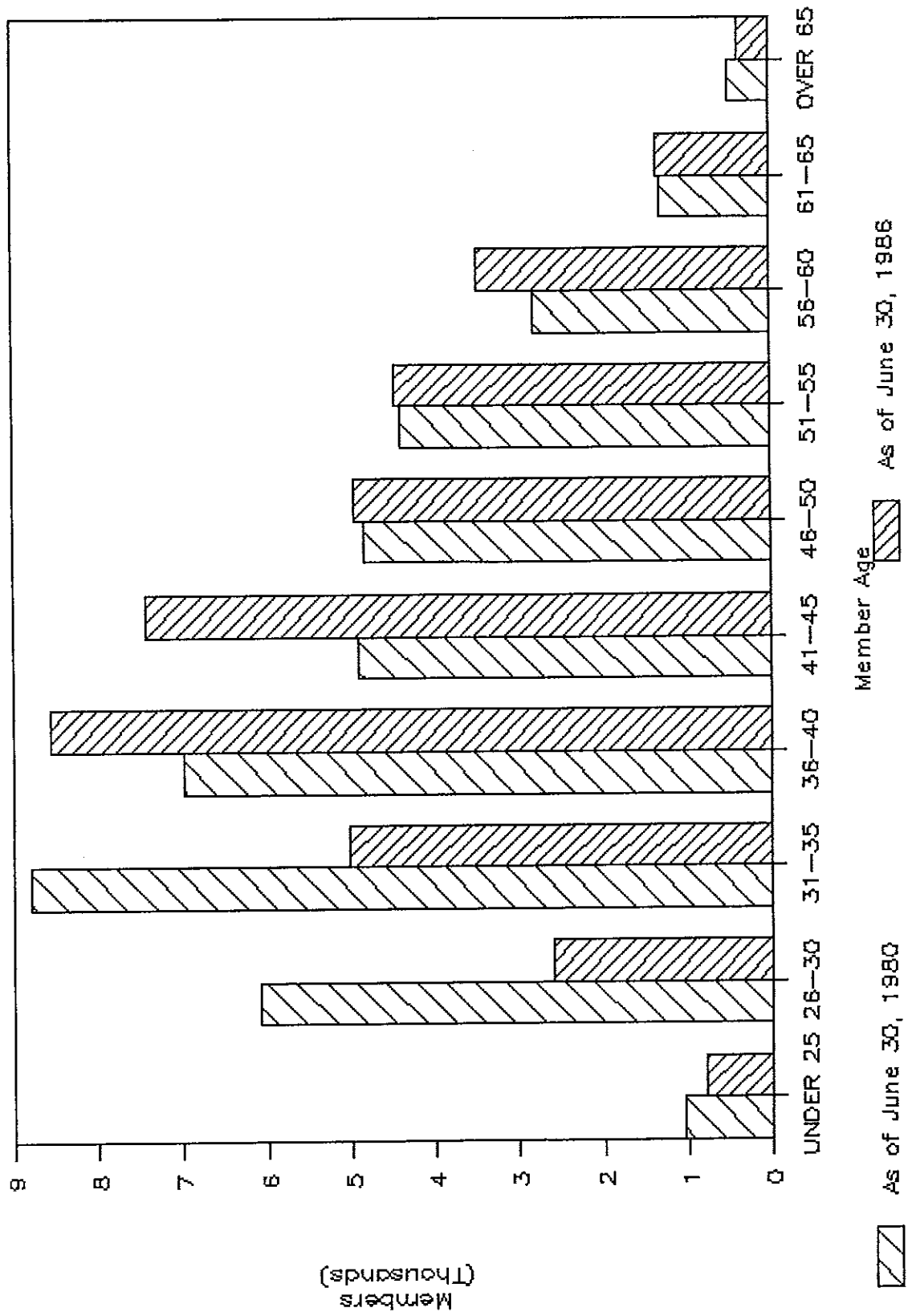
DISTRIBUTION OF MEMBERS BY AGE

1985 & 1986 Comparison



DISTRIBUTION OF MEMBERS BY AGE

1980 & 1986 Comparison



**STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM**

SECTION II - ASSET INFORMATION

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, 1986, the actuarial value of assets as of July 1, 1985 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, 1986 and 20% of the difference was recognized. The resulting value was further adjusted if it was less than 80% or greater than 120% of the market value of assets. This year, the preliminary actuarial value of assets (\$2,164,686,000) was less than 80% of the market value (\$2,183,070,000). Thus, the actuarial value of assets as of June 30, 1986 was set equal to 80% of the market value of assets.

1.	Actuarial Value of Assets as of July 1, 1985	\$	1,821,912,000
2.	Contributions		243,108,000
3.	Benefit Payments		151,565,000
4.	Net Transactions: Item 2 - Item 3		91,543,000
5.	Expected Rate of Return (Change in CPI + 3.0%)		5.9%
6.	Expected Investment Return: Item 5 x (Item 1 + ½ Item 4)	\$	110,193,000
7.	Expected Actuarial Value of Assets as of June 30, 1986: Item 1 + Item 4 + Item 6		2,023,648,000
8.	Market Value of Assets as of June 30, 1986		2,728,837,000
9.	Adjustment: 20% of the Difference between Item 8 and Item 7		141,038,000
10.	Preliminary Actuarial Value of Assets as of June 30, 1986: Item 7 + Item 9		2,164,686,000
11.	Limiting Values:		
	a. 80% of Item 8		2,183,070,000
	b. 120% of Item 8		3,274,604,000
12.	Actuarial Value of Assets as of June 30, 1986: Item 10, but not Less Than Item 11a. or Greater Than Item 11b.	\$	2,183,070,000

STATE OF CONNECTICUT
 STATE TEACHERS' RETIREMENT SYSTEM
SECTION III - VALUATION RESULTS

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 of Retirement Benefits

a.	Member Contributions	\$ 936,532,000
b.	Active Teachers	3,372,445,000
c.	Inactive Teachers	(334,000)
d.	Terminated Vested Teachers	1,623,000
e.	Retired Teachers and Beneficiaries	1,678,301,000
f.	Survivors and Dependents	<u>13,088,000</u>
g.	Total	\$ 6,001,655,000

2. Actuarial Value of Assets

\$ 2,183,070,000

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

\$ 3,818,585,000

B. Normal Cost

1.	Normal Cost as of July 1, 1986	\$ 132,310,000
2.	Annual Compensation of Active Teachers	1,065,077,000
3.	Normal Cost as a Percent of Annual Compensation	12.4%

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
SECTION IV - DEVELOPMENT OF STATE CONTRIBUTION
FOR THE FISCAL YEAR ENDING JUNE 30, 1988

The State contribution for the fiscal year ending June 30, 1988 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, 1987, and an estimate of the July 1, 1987 normal cost. This estimate was based on the July 1, 1986 normal cost and an estimate of future salary increases.

To develop the expected unfunded actuarial accrued liability as of June 30, 1987, the actual unfunded actuarial accrued liability as of June 30, 1986 was added to the normal cost as of July 1, 1986 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 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.

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM
DEVELOPMENT OF STATE CONTRIBUTION
FOR THE FISCAL YEAR ENDING JUNE 30, 1988
(Continued)

	<u>Provisions in Effect June 30, 1980</u>	<u>Public Act 82-91</u>	<u>Total</u>
1. Unfunded Actuarial Accrued Liability as of 6/30/86	\$ 3,790,781,000	\$ 27,804,000	\$ 3,818,585,000
2. Normal Cost as of 7/1/86	132,310,000	--	132,310,000
3. Interest at 8% on (Item 1 + Item 2)	313,848,000	2,224,000	316,072,000
4. State Contributions	(202,495,000)	(1,492,000)	(203,987,000)
5. Interest to End of Year on Item 4	<u>(9,830,000)</u>	<u>(74,000)</u>	<u>(9,904,000)</u>
6. Expected Unfunded Actuarial Accrued Liability as of 6/30/87	\$ 4,024,614,000	\$ 28,462,000	\$ 4,053,076,000
7. Level Percent Amortization Payment (40/26 Years)	165,412,000	1,523,000	N/A
8. Estimated Normal Cost as of 7/1/87	<u>145,541,000</u>	<u>--</u>	<u>N/A</u>
9. Total: Item 7 + Item 8	\$ 310,953,000	\$ 1,523,000	N/A
10. 75% of Item 9 for Provisions in Effect 6/30/80	\$ 233,215,000	N/A	N/A
11. State Contribution Requirement: Item 10 Adjusted with Interest for Payment Quarterly in Advance	\$ 239,996,000	\$ 1,567,000	\$ 241,563,000

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

SECTION V - FUNDED STATUS OF THE SYSTEM

The funded status of the System as of June 30, 1986 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 but earnings projected to retirement using the actuarial assumptions.

A. Actuarial Present Values for:

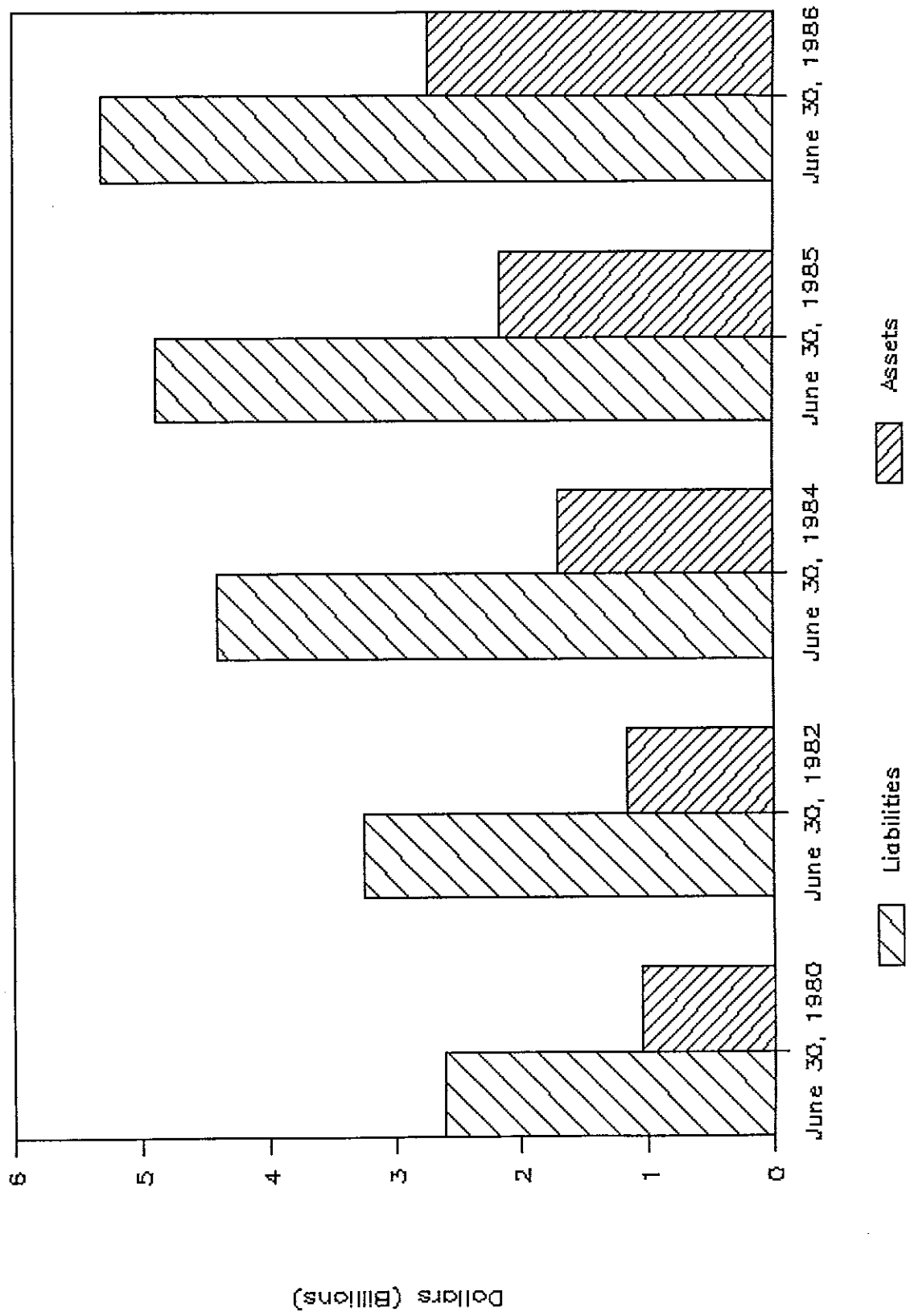
1. Retired Teachers, Beneficiaries Survivors, Dependents, and Other Inactive Teachers	\$ 1,692,678,000
2. Active Teachers	2,676,631,000
3. Member Contributions	<u>936,532,000</u>
4. Total	\$ 5,305,841,000

B. Market Value of Assets \$ 2,728,837,000

C. Funded Ratio: Item B ÷ Item A.3 51.4%

The chart on the following page shows a comparison of liabilities (actuarial present values) and market value of assets for the current valuation and each of the four preceding valuations.

COMPARISON OF LIABILITIES AND ASSETS



STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

OUTLINE OF 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.

Benefit: 2% times years of credited service times average annual salary (maximum percentage is 75%)

plus

any additional amounts derived from 6th percent and voluntary contributions by the teacher.

10. Pre-Retirement Death Benefits

At the election of the member or beneficiary, a lump sum plus survivor's benefit or return of all contributions with interest or surviving spouse's benefit.

- Lump Sum: \$1,000 for 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. \$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.
- Surviving spouse's benefit: the 50% co-participant option.

11. Form of Annuity

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

Optional Forms: 5, 10, 20, or 25 year certain and life. 33-1/3%, 50%, 66-2/3%, 75%, or 100% co-participant (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 Contributions

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 METHOD

The following is a summary of the actuarial assumptions and the actuarial cost method used in this valuation of the State Teachers' 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 5-½% 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.

STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

SUMMARY OF ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

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.

JAN 14 1987

EXHIBIT IV
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STATE OF CONNECTICUT
STATE TEACHERS' RETIREMENT SYSTEM

SUMMARY OF ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

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.