CONNECTICUT STATE
EMPLOYEES'
RETIREMENT SYSTEM

Actuarial Review

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December 23, 1970

Mr. Louis I. Gladstone
Comptroller
State of Connecticut
Office of the Comptroller
30 Trinity Street
Hartford, Connecticut

Dear Mr. Gladstone:

We are pleased to submit herewith our Actuarial Review of the State Employees' Retirement System.

In 1969, the General Assembly appropriated funds for an actuarial study of the State Employees' Retirement System, with particular reference to the contributions required for the System to be funded on a sound actuarial basis. Early in 1970, our firm was authorized to undertake this project.

Our report covers funding, portability of benefit rights, and it includes general consideration of benefit uniformity and plan consolidation.

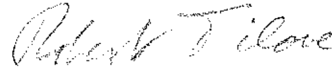
This study has been under my general direction. The actuarial work was done by Mr. Thomas D. Levy, Fellow of the Society of Actuaries and an Associate Actuary of our company. Others participating in the work included Mr. Louis J. Zebedeo, a Vice President and Resident Manager of our Hartford office, and Mr. Jack M. Elkin, a Senior Vice President and our Chief Actuary.

We received a great deal of help from State employees in obtaining the information which forms the basis of this report. Mr. Hugo F. Benigni and Mr. Richard Baronowski of the Auditors' office, Mr. Phillip D. Hurley of the Personnel Department, and Mr. Herbert Laphan of the Payroll Department were most helpful in uncovering possible sources of data and making those sources available as needed. Mr. Gordon L. Partridge, Mr. Donald Briggaman, and Mr. William T. Arnone of the Comptroller's Data Center assisted in processing the data so as to make it usable by us. And most important, Mr. Henry J. Rigney, Chief of the Retirement Division, and his staff were available whenever needed to answer any questions and provide any information requested.

Our findings and recommendations are summarized at the very outset of the report.

We will be pleased to review this report with you and, if you so desire, to discuss its findings with the appropriate State officials.

Sincerely yours,



Robert Tilove
Senior Vice President

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I. SUMMARY AND RECOMMENDATIONS

Benefit Provisions

The Connecticut State Employees' Retirement System covers most State employees except judges, State's attorneys, and those teachers electing coverage under the Teachers Retirement System. There are two levels of benefits -- Part B, providing benefits coordinated with Social Security, and Part C, providing maximum benefits. Employees contribute 5% of their annual earnings, except that Part B members contribute only 2% on earnings covered under Social Security (currently $7,800).

The System provides unreduced benefits of 2% per year of service. Such benefits are available to men at least age 55 with 25 years service or age 65 with 10 years service. Women may take their benefits 5 years younger than men. State police can retire at age 47 if they have 20 years service, at 50% of salary plus 2% for each year of service over 20. Benefits are based on the highest 3 years' earnings. After retirement, cost of living increases are provided up to 6% per biennium.

The plan also provides disability and vesting benefits after 10 years of service.

Present Retirement Fund

The State Employees Retirement Fund consists of employee contributions, some State contributions, and investment income. From this fund are paid a portion of each pension and returns of employee contributions. As of December 31, 1969, the Fund totalled $40.7 million, of which 1.1% was in cash, 93.2% was in bonds, and 5.7% was in stocks. It is our understanding that this amount is less than the accumulated contributions from members of the System as of that date.

Employee Data

We received data on 42,958 active employees as of December 31, 1969. Of these, 27,158 were men and 15,800 were women. On the average, employees were age $43\frac{1}{2}$ and had 10 years of service. The average salary was $8,067 ($9,073 for men and $6,589 for women).

Over 10% of the employees were hired after age 45. This is a high percentage compared to private industry, but not compared to public employment. This contributes to a relatively high pension cost.

Retiree Data

We received data on 6,296 pensioners and beneficiaries as of December 31, 1969. Their average monthly pension was $255. ($291 for men and $216 for women.) About 44% of all present pensioners retired in the last five years. Because of salary increases, recent retirees receive substantially higher pensions than those who retired some time ago. On the average, both men and women have been retiring at about age 62.

Actuarial Valuation

Our valuation was prepared as of December 31, 1969. Our calculations were based on what we feel are reasonable assumptions as to mortality, disability, terminations from employment, and retirement ages. For salary projections, we used a scale reflecting the State's salary schedules. We assumed that investment yield over the long term would be 4%.

To show the effect of general increases, we did an alternative calculation assuming 3% per year general salary increases, 3% per year cost of living increases in pensions, and a 7% investment yield. We used the "entry age normal cost method of funding", which spreads the cost of each employee's pension as a level percentage of his earnings from date of hire to retirement.

The normal cost* (or current service cost) to the State is $21.4 million. This is 8.5% of the payroll of participating employees with at least one year of service; it is 6.9% of the total payroll for all State Employees.

If we assume 3% general salary increases, 3% pensioner increases, and 7% investment yield, the normal cost rises to $23.2 million.

The past service liability* (for benefits earned before 1970) is $753 million, of which $249 million represents the liability to those already receiving pensions. The unfunded liability accrued to the end of 1969 was about $712 million. (This is not a deficit, in the usual accounting sense, but rather is a figure calculated so as to be a basis for determining an appropriate pension contribution.)

Financing the System

The State Employees Retirement System is financed essentially on a pay-as-you-go basis. Part of the benefit payments are met out of the Retirement Fund, which consists largely of accumulated employee contributions. The major part is met out of year-to-year appropriations by the State.

The appropriation in fiscal 1969-71 was about $27 million for the two year period. An actuarial projection establishes that by 1990 the required appropriation will be at least six times higher, that is, at least $186 million.

Pay-as-you-go financing is bound to increase rapidly over a long period of years. One of the problems is that rapidly increasing cost may ultimately arouse resistance to further increases and therefore prompt a search for ways to avoid fulfilling the benefit promises. Pay-as-you-go postpones to a future generation the cost of pensions accruing for employees who provide services to the present generation.

Actuarial funding has these advantages:

1. It provides a greater security to the employees by levelling costs as well as by accumulating reserves that guarantee the payment of benefits for a prolonged period even if contributions are curtailed or prove deficient in some future year.

2. It reduces cost by securing substantial investment income on the reserves that will accumulate.

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* Please refer to the "Actuarial Valuation" section of the report for definitions of these terms.

3. It links benefit changes to their long-term cost, so that employees, State officials and legislators, and the public generally can appreciate the cost implications of future enactments.

These considerations have generally been persuasive. Massachusetts is the only other state with a pay-as-you-go state retirement system.

The most economical funding would be a massive grant to the Retirement System in the immediate future, made possible by borrowing funds, either directly or by giving the System State bonds which it could sell. There is bound to be a substantial differential between the cost to the State of borrowing funds and the yield which the Retirement System could earn by investing such funds in corporate securities and mortgages. This differential would represent net income that would drastically reduce the inevitable cost of the retirement plans.

Concededly, this proposal is novel and it is subject to misunderstanding. Consequently, an alternative is proposed.

We recommend that legislation be enacted to require actuarial funding keyed to the payment of "normal cost" ("current service costs") plus amortization of the unfunded accrued liability ("past service costs") over a period of 40 years.

If this were to be launched full blown, it would require an appropriation of 18% of covered payroll. So large an increase in the appropriation may pose too great a fiscal problem for the State at this time. Consequently, we recommend as one possibility a graduated introduction over the next 11 years to the full 40-year amortization schedule. This would call for payment of the actuarially calculated normal cost of the System plus payments with respect to the unfunded past service liability as follows:

Future fiscal year	Percentage to be paid of full 40-year amortization
First	0%
Second	10
Third	20
Fourth	30
Fifth	40
Sixth	50
Seventh	60
Eighth	70
Ninth	80
Tenth	90
Eleventh	100

This schedule will begin the full 40-year period with the 11th year. The goal of full funding would therefore be set for the 50th year.

Under this graduated schedule, the appropriation for the first two years would be somewhat higher than the appropriations required under the present pay-as-you-go system. The estimate for that would require $23 million the first year and $27 million the second, compared to $17 million and $20 million with continuation of pay-as-you-go. Thereafter, the graduated amortization schedule would increasingly require greater contributions than under pay-as-you-go.

Ultimately, however, because the actuarial funding contribution results in the accumulation of reserves that are invested, the appropriations required will prove to be significantly less than the appropriations that will be forced on the State on a pay-as-you-go basis.

If even the $6 million and $7 million increases in the first two years seem beyond the State's current financial means, we propose one other alternative, which starts more modestly than the above schedule. It consists of contributions of the following percentages of normal cost plus 40 year amortization:

Future fiscal year	Percentage to be paid of normal cost plus full 40-year amortization
First	30%
Second	35
Third	40
Fourth	45
Fifth	50
Sixth	55
Seventh	60
Eighth	65
Ninth	70
Tenth	75
Eleventh	80
Twelfth	85
Thirteenth	90
Fourteenth	95
Fifteenth	100

On this basis, the appropriation is $17 million the first year and $20 million the second -- the same as for the present system.

While graduating the impact on the State budget, these schedules of funding would serve to link changes in the System to their ultimate cost implications.

To pursue this concept further, we recommend that legislation be enacted to require that every bill affecting retirement benefits be accompanied by an actuarial estimate of cost based on normal cost plus 40-year amortization of the added unfunded accrued liability.

Portability

It is a desirable objective for public employees within the State of Connecticut to be able to shift from one public employment to another without damaging their ultimate pension rights. Present law makes inadequate provision to that end through incomplete arrangements for purchases of service in the new system to which an employee may transfer. Present arrangements are inequitable and will eventually result in anomalies, including situations in which an employee who is presumably protected actually loses benefits as a result of a change in employer.

We recommend legislation to provide full protection of pension rights for employees who transfer from one State, municipality, or school district employment to another. We recommend that this take the form of provisions in each plan to recognize the other types of Connecticut public employment toward eligibility for benefits; the benefit amount for a particular plan still being calculated solely on the basis of credit for employment directly under that plan. Each plan would, however, recognize the ultimate 3-year final average salary of the employee based on all Connecticut public employment.

Present provisions for the purchase of credit for out-of-state employment would not be disturbed.

These provisions for reciprocal recognition of credit for purposes of eligibility should, in our opinion, apply to the individual municipal plans as well.

Uniformity and Consolidation

It is natural to consider whether it would be desirable for the three state plans - State Employees, Teachers and Municipal Employees - to have uniform benefits and whether there would be advantages to a consolidation of the Systems. Three separable aspects are involved: (1) benefit uniformity; (2) consolidation

of administration; and (3) merger of funding. Uniformity of benefits would be a far-reaching step that might amount to incorporating the most liberal features of each plan. They are so widely different that the step would be expensive. Unless and until possible whipsawing of benefit changes makes the creation of an integrated plan urgent, we suggest that such a far-reaching step does not warrant consideration.

Merger of funds would not serve any useful purpose; it would only use the funding of one system to help strengthen the reserves of the other systems but with no net gain overall.

Consolidation of administration would in the absence of a single retirement law have minimum advantage and it is therefore not recommended.

II. BENEFIT PROVISIONS

Coverage

Virtually all non-teaching employees of the State may be covered except for those covered under the State's Attorneys' and Probate Court Retirement Systems. Teachers in State employment may elect either the State Employees' Retirement System or the Retirement System for Teachers. Prior to becoming a permanent employee in the classified service, each employee (except police) may elect either "Part B," which provides benefits integrated with Social Security benefits, or "Part C," providing maximum benefits unreduced for Social Security. He may also elect not to participate. Once an employee becomes a permanent employee in the classified service, he may not change his election except to upgrade his benefits from Part B to Part C.

State police are covered for benefits similar to those of Part C; they are not under Social Security.

Employee Contributions

State police and Part C employees contribute 5% of their salary. Part B employees contribute 2% of that part of their earnings on which Social Security contributions are deducted (currently $7,800 per year) plus 5% on salary in excess of that amount. In addition, State police pay 1½% of the first $4,800 of salary to pay for survivor's benefits.

Retirement Benefits

Unreduced benefits are available after 25 years of service to men age 55 and women age 50, and after 10 years of service to 65 year old men and 60 year old women. Benefits are based on "base salary" -- the average salary of the three highest years of State service.

Part C members receive a pension of 2% of base pay per year of service. Part B members receive the same benefit until age 65, at which time their benefit is recomputed based on 1% of the first $4,800 of base pay plus 2% of base pay in excess of $4,800 per year of service.

State police can take unreduced benefits at age 47 if they have 20 years of service. Their benefit is 50% of base salary plus 2% of salary per year of service over 20.

Men retiring after age 70 and women retiring after age 65 with at least 5 years of service get a benefit of 2½% of salary (1¼% on the first $4,800 under Part B) per year of service (maximum 20 years) if this will provide a larger benefit.

Note that Part B benefits are integrated based on a $4,800 salary, although contributions are based on the actual Social Security wage base each year (now $7,800). Thus each time the Social Security wage base is increased, the Part B contributions decrease but the benefits do not.

Under certain conditions, a member may elect an option that gives him a reduced pension but guarantees that some or all of his pension will be payable to his widow after his death.

The Retirement Fund consists essentially of accumulated employee contributions. A portion of each pension payment comes from the Retirement Fund, with the balance coming from State appropriations. The Retirement Fund is presently the source of 35% of each payment, but this will drop in two steps to 25% after June 30, 1973.

If a pensioners dies before the portion of his pension payments paid from the Retirement Fund exceeds his own contributions, the balance of his contributions will be paid to his beneficiary.

After retirement, there is a "cost-of-living" adjustment every two years. Each person's pension is increased by the percentage increase in the Consumer Price Index over the two year period. If this would give more than a 6% increase, then only a 6% increase is in fact given; the excess over 6% does not carry forward to the cost-of-living calculation for the following two years.

Disability Benefits

A member who becomes unable to perform his job due to disability will get a pension if he has ten years of service or if the cause of disability was job-connected. The pension is 50% of base salary plus 2% of salary per year of service in excess of 25 years (20 years for State Police). Part B members will get a reduction based on the first $4,800 of salary at age 65 or when they qualify for Social Security disability benefits.

Death Benefits

In general, the beneficiary of an employee who dies in active service will receive a refund of the employee's own contributions. If an option is in effect, however, there may be a pension payable to the widow. A widow of a policeman receives $150 per month as long as she has children under 18 or is herself over age 55, provided she has not remarried. In addition, there is a payment of $100 a month for one child under 18 and $150 a month for more than one such child.

Withdrawal Benefits

An employee who terminates employment after 10 years of service (with at least the last 5 continuous) may choose either a deferred pension (based on his accumulated credits) or a refund of his contributions. Any other former employee is entitled only to a refund of his contributions, unless he is already eligible for a pension.

III. PRESENT RETIREMENT FUND

In connection with the State Employees' Retirement System, the State Treasurer maintains the State Employees' Retirement Fund. This Fund is the only accumulation of funds to offset the liabilities of the System for future pensions.

The Fund receives all employee contributions. When budgetary considerations permit, legislative grants are made to the Fund in addition. The assets are invested in accordance with the State's trust law, with the income being added to the Fund. In general, the bulk of the assets have been invested in bonds of governments, public utilities, railroads, and government corporations (e.g., the Federal National Mortgage Association). There have also been somewhat smaller investments in other bonds and in bank and public utility common stocks.

Payments out of the Fund are primarily for refunds of employee contributions and for pension payments. Contribution refunds occur when an employee terminates employment and elects to take a refund, or when he dies after retirement without having received annuity payments from the Fund equal to his total contributions. The bulk of each month's pension payments comes from State appropriations. However, a portion comes from the Fund. By statutory provision, this portion is currently 35%, but it will drop to 30% after June 30, 1971 and 25% after June 30, 1973.

As of December 31, 1969, the State Employees' Retirement Fund had assets of $40,735,268.29, consisting of $467,118.95 in cash, $37,969,163.49 in bonds, and $2,298,985.85 in stocks. It is our understanding that this is less than the accumulated contributions from members of the System as of that date.

IV. EMPLOYEE DATA

Data Collection and Editing

Collecting and editing the data on active employees proved to be a major task. The problems and solutions in this area are described in Appendix A at the end of the report.

Significant Data

The following is a summary of significant employee characteristics. Excluded from the averages are all employees for whom that statistic is "unknown" on the detailed census tables which are discussed later.

Item	Total	Men	Women
Number of employees	42,958	27,158	15,800
Average age	$43\frac{1}{2}$	$43\frac{1}{2}$	$43\frac{1}{2}$
Average service	10	10	10
Average salary	$8,067	$9,073	$6,589

The average age and average service are the same for both sexes; the average salary, however, is much lower for women than for men.

Tables 1 and 2 give detailed breakdowns on active employees, showing number of employees and average salary by age, years of service, and sex. The average salaries shown in the "Total" column exclude those employees who were hired in 1969 or whose date of hire is unknown. Most of these employees did not receive a full year's salary in 1969; to include them for less than a full year's salary would artificially lower the averages.

It is notable that 10 percent of the active employees were hired after age 45. Compared to private industry, this is a high percentage. We have found it to be fairly characteristic of public employment; it contributes to a comparatively high pension cost.

Table 1
Number and Average Salary of Employees in Active Service as of December 31, 1969
by Age and by Years of Service
Men

Age		Total	Years of service								
			1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 and over	Unknown*
Total	Number	27,158	6,028	4,543	3,131	2,024	1,771	613	449	218	8,381
	Salary**	$9,073	$7,537	$8,737	$9,362	$10,206	$11,372	$11,492	$11,839	$12,692	-
Under 20		158	28	-	-	-	-	-	-	-	130
		$3,577	$3,577								-
20 - 24		1,344	645	86	-	-	-	-	-	-	613
		$5,800	$5,769	$6,038							-
25 - 29		2,418	1,052	624	56	1	-	-	-	-	685
		$7,634	$7,606	$7,654	$7,808	$12,351					-
30 - 34		2,322	710	635	480	59	-	-	-	-	438
		$8,836	$8,510	$9,099	$8,941	$9,031					-
35 - 39		2,338	613	534	515	256	55	1	-	-	364
		$9,338	$8,664	$9,823	$9,633	$9,319	$9,431	$10,256			-
40 - 44		2,700	659	505	500	420	285	42	3	-	286
		$9,784	$8,373	$10,035	$10,406	$10,441	$10,483	$10,177	$10,271		-
45 - 49		2,766	554	554	419	420	442	95	16	1	265
		$9,935	$8,256	$9,389	$10,108	$11,427	$11,023	$10,423	$10,282	$10,407	-
50 - 54		2,545	572	419	343	327	401	161	108	10	204
		$9,504	$7,156	$9,009	$9,360	$10,296	$11,751	$10,986	$11,034	$13,022	-
55 - 59		2,245	448	383	330	268	310	150	153	61	142
		$9,319	$6,808	$7,525	$8,743	$9,547	$12,273	$12,097	$12,168	$12,142	-
60 - 64		1,611	294	350	259	158	168	93	115	91	83
		$9,213	$6,554	$7,879	$8,322	$9,760	$11,549	$12,610	$12,278	$12,858	-
65 and over ..		838	137	176	162	84	90	61	47	49	32
		$8,807	$6,707	$7,151	$7,934	$8,695	$11,293	$11,876	$11,436	$12,793	-
Unknown		5,873	316	277	67	31	20	10	7	6	5,139
		$8,490	$6,895	$8,770	$9,681	$11,079	$14,442	$13,629	$16,802	$14,777	-

*The data did not permit separation of 1969 hires from those with unknown date of hire. Thus, both these groups are included as "Unknown Years of Service." We have omitted salary statistics for this group because most of them received less than a full year's salary in 1969.

**Average salary received in 1969 for those not classified as "Unknown Years of Service."

Table 2
Number and Average Salary of Employees in Active Service as of December 31, 1969
by Age and by Years of Service
Women

Age		Total	Years of service								
			1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 and over	Unknown*
Total	Number	15,800	5,171	2,851	1,843	1,174	852	492	245	151	3,021
	Salary**	$6,589	$5,653	$6,446	$7,039	$7,724	$8,172	$8,515	$8,489	$8,775	-
Under 20		314 $3,985	74 $3,985	-	-	-	-	-	-	-	240 -
20 - 24		1,788 $5,331	939 $5,344	66 $5,151	-	-	-	-	-	-	783 -
25 - 29		1,353 $6,330	656 $6,300	307 $6,492	35 $5,451	-	-	-	-	-	355 -
30 - 34		948 $6,467	345 $6,124	193 $6,826	157 $6,782	23 $6,437	-	-	-	-	230 -
35 - 39		1,156 $6,504	405 $5,673	181 $6,926	141 $7,341	147 $7,438	35 $6,653	-	-	-	247 -
40 - 44		1,740 $6,690	546 $5,874	303 $6,818	191 $7,393	165 $7,655	202 $7,225	24 $6,897	-	-	309 -
45 - 49		2,230 $6,766	722 $5,797	446 $6,396	265 $7,339	167 $8,142	168 $8,419	150 $8,166	9 $6,291	-	303 -
50 - 54		2,260 $6,772	644 $5,498	476 $6,399	336 $7,214	222 $7,893	143 $8,531	117 $8,718	92 $8,029	10 $7,470	220 -
55 - 59		1,828 $7,025	381 $5,671	401 $6,416	336 $7,096	210 $7,938	134 $8,573	94 $8,569	85 $8,607	57 $8,043	130 -
60 - 64		1,114 $7,191	177 $5,517	216 $6,265	232 $6,811	157 $7,713	107 $9,000	67 $8,690	41 $9,890	54 $8,995	63 -
65 and over ..		479 $6,960	48 $4,437	81 $5,968	115 $6,172	72 $7,022	60 $8,434	32 $9,608	16 $8,224	30 $9,895	25 -
Unknown		590 $5,493	234 $4,660	181 $6,067	35 $6,474	11 $6,152	3 $7,052	8 $10,477	2 $7,872	-	116 -

*The data did not permit separation of 1969 hires from those with unknown date of hire. Thus, both these groups are included as "Unknown Years of Service." We have omitted salary statistics for this group because most of them received less than a full year's salary in 1969.

**Average salary received in 1969 for those not classified as "Unknown Years of Service."

V. RETIREE DATA

For information on retired State employees, we relied on the Retired Master File of the Auditor of Public Accounts. From this, we got each pensioner's name and number, his benefits including any option and Social Security adjustments, his birth and retirement dates, cost-of-living changes, sex, etc. While the data was generally quite complete, birthdates were missing for most people who retired more than seven years ago.

The following are significant statistics on the retiree group:

Item	Total	Men	Women
Number	6,296	3,265	3,031
Average age (estimated)	69	69	69½
Average monthly pension	$ 255	$ 291	$ 216

Tables 3 and 4 give detailed breakdowns of the pensioners by age and year of retirement, for men and women, respectively. Each "cell" includes the number of people and the average monthly pension of those people. Those retirees at the younger ages are disability pensioners.

It is notable in that pension amounts have increased rapidly, the result in large part of increased salaries. Men who retired in 1965-1968 average $310 a month; those who retired in 1969 average $378 a month. For women, the corresponding figures are $226 and $272. Also of consequence is the rapid increase in the number of pensioners in recent years. About 44% of the present pensioners retired in the last 5 years.

On the average, both men and women have been retiring at about 62, despite the fact that plan provisions allow women to take their pensions five years younger than men may take theirs.

Table 5 gives a distribution of annual pension amounts as of December 31, 1969.

Table 3
Number and Average Monthly Pension of Retirees as of December 31, 1969,
by Age and by Year of Retirement
Men

Age		Total	Year of Retirement							
			1969	1965-1968	1960-1964	1955-1959	1950-1954	1945-1949	Before 1945	Unknown
Total	Number Amount*	3,265 $291	415 $378	1,054 $310	917 $281	509 $252	259 $225	80 $206	28 $243	3 $287
Under 50		72 $323	14 $401	46 $320	11 $261	1 $52	-	-	-	-
50 - 54		77 $356	21 $351	36 $367	19 $349	1 $180	-	-	-	-
55 - 59		269 $402	95 $431	145 $396	27 $339	2 $356	-	-	-	-
60 - 64		443 $419	101 $401	202 $413	136 $444	4 $307	-	-	-	-
65 - 69		534 $309	113 $358	282 $286	130 $314	9 $374	-	-	-	-
70 - 74		492 $227	69 $312	314 $217	103 $196	6 $242	-	-	-	-
75 - 79		115 $169	-	2 $76	104 $162	9 $268	-	-	-	-
80 and over ..		10 $163	-	-	2 $203	8 $152	-	-	-	-
Unknown		1,253 $247	2 $287	27 $317	385 $260	469 $251	259 $225	80 $206	28 $243	3 $287

*"Amount" is average monthly pension currently payable.

CSERS

Table 4
Number and Average Monthly Pension of Retirees as of December 31, 1969,
by Age and by Year of Retirement
Women

Age		Total	Year of Retirement						
			1969	1965-1968	1960-1964	1955-1959	1950-1954	1945-1949	Before 1945
Total ..	Number	3,031	338	942	787	548	279	94	43
	Amount*	$216	$272	$226	$224	$188	$176	$149	$170
Under 50		36 $256	10 $282	13 $249	12 $260	1 $27	-	-	-
50 - 54		108 $263	39 $261	59 $265	9 $268	1 $190	-	-	-
55 - 59		241 $262	67 $252	133 $243	41 $337	-	-	-	-
60 - 64		360 $262	84 $242	176 $271	95 $264	5 $254	-	-	-
65 - 69		567 $216	101 $290	311 $203	143 $202	11 $127	1 $124	-	-
70 - 74		376 $202	31 $332	196 $197	145 $185	4 $55	-	-	-
75 - 79		45 $205	-	4 $169	27 $252	14 $127	-	-	-
80 and over		2 $309	-	-	1 $150	1 $469	-	-	-
Unknown		1,296 $194	6 $355	50 $233	314 $220	511 $191	278 $176	94 $149	43 $170

*"Amount" is average monthly pension currently payable.

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Table 5

Pensions in Force on December 31, 1969
by Sex and by Annual Amount

Annual Amount *	Total	Sex	
		Men	Women
Total	6,296	3,265	3,031
Under $1,000	1,044	432	612
$1,000 - $1,999	1,367	562	805
2,000 - 2,999	1,117	548	569
3,000 - 3,999	1,111	615	496
4,000 - 4,999	632	382	250
5,000 - 5,999	439	306	133
6,000 - 6,999	236	167	69
7,000 - 7,999	134	96	38
8,000 - 8,999	77	58	19
9,000 - 9,999	58	39	19
Over $10,000	81	60	21

*Annual amount currently payable

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VI. ACTUARIAL VALUATION

Valuation as of December 31, 1969

Our valuation was prepared as of December 31, 1969, the latest date for which the necessary data was available.

Actuarial Assumptions

The actual cost of a pension plan consists of the benefit payments and administrative expenses less any investment earnings. An actuarial cost method aims to budget this true cost so as to establish a reasonable relationship between employer pension contributions and the employee services that give rise to the pension obligation. The result is an employer contribution which anticipates future costs. A fund accumulates which earns investment income, thus reducing the ultimate cost.

Calculating the appropriate contribution requires that projections or assumptions be made as to future experience. Some items, such as mortality rates, can be predicted fairly accurately. Others, such as future salary increases, are, of course, subject to considerable error. It will be useful to identify the assumptions used, particularly since broad questions of fiscal policy are implicit in certain of the assumptions.

Mortality Rates

We assumed that mortality rates would conform with the Group Annuity Mortality Table for 1951 projected to 1960. This has proven to be a reasonable basis for predicting the current mortality of white collar groups. It is one of the tables in general use in valuing pension plans in the United States. Table 6 shows the life expectancy at various ages predicted by this assumption.

Table 6

Expected Number of Years of Life
Remaining at Specified Ages

Group Annuity Mortality Table, 1951
Projected to 1960

Age	Number of years	
	Male	Female
55	22.9	27.0
56	22.1	26.2
57	21.3	25.3
58	20.5	24.5
59	19.8	23.7
60	19.0	22.9
61	18.3	22.1
62	17.5	21.3
63	16.8	20.5
64	16.1	19.8
65	15.4	19.0
66	14.7	18.3
67	14.0	17.5
68	13.4	16.8
69	12.8	16.1
70	12.2	15.4
71	11.6	14.7
72	11.0	14.0
73	10.4	13.4
74	9.9	12.8
75	9.4	12.2

GA 1960, female - 5.

Disability Rates

We have assumed employees will become disabled according to the following rates:

Age	Rate (%)
37	.1
42	.1
47	.2
52	.6
57	1.1
62	3.2

These rates are based on Railroad Retirement studies and are generally conservative - that is, they predict fairly high rates of disability. It is one of the tables in general use today.

Salary Projections

The System provides benefits that are based on the three highest years' salary for each employee. To assume that each employee's salary will be the same in the three years before retirement as it is today would therefore seriously understate the System's cost. We therefore use a salary projection to anticipate future increases in earnings. Additionally, it is appropriate to compute pension cost level as a percentage of payroll rather than level as a dollar amount, and a salary projection is also used for this purpose. If the cost were calculated as a level dollar amount for an individual, the cost might be a high percent of his pay when he was young and a lower percent of his higher salary at a later age. By use of a salary projection, the contribution for an individual, all other things remaining the same, tends to stay at the same percentage over the years.

How to project future salaries is a major policy question. To what extent should one seek to anticipate, through present contributions, the full impact on pension costs of future salary changes?

A historical record of the average salaries of State employees is given in Table 7. Over the past 15 years the average State salary has almost doubled. To assume that salaries will continue to increase at this rate would drastically increase the calculated funding contribution for the System. As a consequence, the State would be setting money aside now to meet the effects of future general salary increases, including increases to be granted in inflationary periods. The State would be contributing "hard" dollars today to meet comparatively "soft" dollar obligations in the future.

A case can be made for contributing the hard dollars if they could be invested in securities, the value of which would keep pace with increasing salaries. However, we can make no assumption on that score.

We have resolved this issue for purposes of our cost determination, by making a basic calculation that ignores the effect of general salary (as opposed to career type) increases in the future and by making an alternative calculation that assumes that the salary levels of State employees will increase an average of 3 percent a year (over and above the normal salary progression of the employee).

Our basic calculation reflects salary increases only as the result of longevity and promotions. The scale has relatively greater increases at the younger ages to correspond with the State's salary schedules, which have only seven steps in each salary group. In order to show what effect general increases can have on costs and salaries, our alternative calculation uses a salary projection that has general increases of 3% per year in addition to the increases in the basic scale. The salary scale factors are:

	Present Salary as a Percent of Age 65 Salary	
Present Age	Basic Calculation	Alternative Calculation
22	48.4%	13.6%
27	56.8	18.5
32	65.1	24.6
37	73.4	32.1
42	81.8	41.4
47	89.4	52.5
52	95.0	64.7
57	98.7	77.9
62	100.0	91.5

Table 7

Average Salary of Full-Time State Employees, 1955-1969*

Date	Average Salary
December 31, 1955	$3,952
December 31, 1960	4,607
December 31, 1965	6,058
December 31, 1966	6,268
December 31, 1967	7,192
December 31, 1968	7,211
June 30, 1969	7,314
December 31, 1969	7,533**

* Based on Personnel Department statistics, excluding judiciary, university, college, agricultural station, elected official, and statutory salaries.

** Estimated by applying 3% general increase as of October, 1969 to average salary as of June 30, 1969.

Note the drastic difference that results from assuming as little as 3% per year general increases. Someone now 32 who is earning $7,000 a year will retire at age 65 from a job paying $28,000 a year; without the 3% annual increment, his final salary would be only $10,500.

As will appear, the problem of salary projection has a parallel in the question of choosing an assumption as to future investment yield and the two are somewhat interrelated.

Termination Rates

In any employee group, many employees will terminate and receive less than full benefits. Employees terminating with less than ten years of active service, for example, receive only a refund of their contributions. The termination assumption anticipates the release of State funds that may have been accumulated for such people, thus resulting in a reduced ongoing cost. Our termination data, although limited, showed quite high turnover rates for new employees. As a result, we decided to include no cost for employees with less than one year of service. For employees with more than one year of service, we assumed that terminations each year from all causes except retirement would be as follows:

	Rate (%)	
Age	Men	Women
22	6.0%	7.9%
27	5.1	7.7
32	4.8	7.0
37	4.4	6.0
42	3.9	4.9
47	3.2	3.9
52	1.7	2.7
57	2.4	2.4
62	5.1	5.1

These rates are moderately high.

Retirement Ages

The System provides unreduced benefits as early as age 55 for men, 50 for women and 47 for State police. Experience in recent years, however, has been that, on the average, men retire around age 62 and women at a slightly younger age. We have assumed men will retire when they are both over age 60 and have completed 30 years of service, but not later than age 65. Women, we have assumed, will retire at age 60. State police retirements are assumed to occur when the officer is both age 52 and has 25 years of service. In any case where the employee already meets these assumed conditions of age and service, it is projected that he will retire immediately.

Post-Retirement Increases

Cost-of-living increases are regularly provided to pensioners. Our basic calculation assumes no future benefit increases due to changes in the cost of living. The reasons for this are the same as the ones given above for omitting general increases from the basic salary scale.

Our alternative calculation includes 3% per year increases in pensions. This is in line with both our assumed general salary increases for active employees and the 6% limit in pension increases per biennium as provided in the law.

Investment Yield

Investment yield has a profound effect on the ultimate cost of a retirement system. In general, if a system is actuarially funded (so that it has a substantial reserve which is earning an investment yield), a yield of 5% - in contrast to a 4% yield - will reduce cost by 16-20 percent.

An assumption must be made concerning future yields. It must be a rate that will be valid for the long run, that is, not only for money invested today or next year, but also for money invested 10 and 20 years from now.

We selected an interest rate assumption of 4% per year for our basic calculation. Table 8 gives a historical record of high grade bond yields in this country. This indicates the reasonableness of 4% as a long-term expected yield for a pension fund such as this one. In the light of current practices, the 4% assumption is conservative, that is, it projects higher contribution requirements than would a $4\frac{1}{2}$% or 5% assumption, both of which are in current usage. On the other hand, we have made our basic calculation without including the ultimate effect of continuing <u>general</u> increases in salary levels. As explained earlier, that fact tends to understate the actual cost that will emerge. The two factors are - in a very broad sense - compensating.

If the future is to witness continuing price and salary inflation, it will be reflected, over the long run, in investment yields as well. This is particularly true of growth in common stock values. Consequently, if one is to take account of future general increases in salaries, one should also take account of the probability that a balanced investment portfolio will earn more than 4%. Consequently, in our alternative calculation, the one based on general salary increases of 3% a year, we have used an investment yield assumption of 7%.

Funding Method

We have used the "entry age normal cost method of funding." This method spreads the cost of the benefits to be provided to an individual as a level percentage of his pay from his date of employment to his assumed date of retirement. The normal cost for the entire system is equal to the sum of the normal costs for all participants. In a rough sense, it can be visualized as the cost of benefits earned during the current year.

The past service liability represents the amount which would now be on hand if contributions sufficient to meet the normal costs of the System had been made each year in the past. It can also be viewed, roughly, as the value of benefits accrued for service prior to the valuation date.

Table 8

Standard and Poor's High Grade Corporate
Bond Indexes -- Composite

Year	Yield to maturity
1900	4.49%
1905	4.28
1910	4.60
1915	4.83
1920	6.18
1925	4.93
1930	4.71
1935	3.61
1940	2.92
1945	2.61
1950	2.59
1955	3.04
1956	3.38
1957	3.91
1958	3.80
1959	4.38
1960	4.41
1961	4.36
1962	4.29
1963	4.24
1964	4.37
1965	4.47
1966	5.13
1967	5.53
1968	6.05
1969	6.93

Overall Actuarial Basis

We believe that our assumptions are reasonable, both individually and collectively. To the extent that actual experience is better or worse than assumed, gains or losses will develop, with appropriate decreases or increases in future costs.

Missing data

It was also necessary to make certain "non-actuarial" assumptions where data was missing or incomplete. For example, our pensioner data lacked birthdates for most of those who retired over 7 years ago. We assumed that they were age 62 on their retirement date, since this was consistent with our known data. Similarly, where we lacked dates of birth on active employees we assumed that they were hired at age 35. We assumed that the individuals for whom we lacked employment dates had the same characteristics as the group as a whole. We also made a small adjustment for purchased service and estimated the current value of each employee's past contributions.

Results of Valuation

The plan provides benefits on four different occurrences: retirement, death, disability, and withdrawal from employment. We calculated costs separately for each of these types of benefits. The cost factors are shown in Table 9 . As previously indicated in our discussion of employee turnover, these cost factors do not include either State or employee contributions for employees with less than one year of service.

The alternative results if we assumed 3% general salary increases each year and 7% investment yield are shown in Table 10 .

Table 9

Summary of Cost Factors as of December 31, 1969
Basic Calculation *

Item	Retirement Benefits	Death Benefits	Disability Benefits	Withdrawal Benefits	Total
Current Service Cost --					
Police	$ 1,077,300	$ 27,900	$ 36,800	$ 104,000	$ 1,246,000
Part B	14,821,000	276,400	2,296,600	1,731,800	19,125,800
Part C	6,405,000	190,800	1,132,200	861,700	8,589,700
Total	$ 22,303,300	$ 495,100	$ 3,465,600	$ 2,697,500	$ 28,961,500
Less Employee Contributions					-7,575,700
Normal Cost to State					$ 21,385,800
Past Service Liability --					
Police	$ 17,880,300	$ 194,700	$ 349,900	$ 75,300	$ 18,500,200
Part B	243,586,500	2,439,700	25,540,200	7,812,500	279,378,900
Part C	190,530,500	1,663,600	12,076,900	2,241,100	206,512,100
Total Active Employees	$451,997,300	$4,298,000	$37,967,000	$10,128,900	$504,391,200
Pensioners					248,867,700
Total					$753,258,700
Less Assets in Fund					-40,735,300
Unfunded Past Service Liability					$712,523,400

* Assumes no general salary increases, no post-retirement pension increases, and a 4% investment yield.

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Table 10

Summary of Cost Factors as of December 31, 1969
Alternative Calculation *

Item	Retirement Benefits	Death Benefits	Disability Benefits	Withdrawal Benefits	Total
Current Service Cost --					
Police	$ 1,114,400	$ 16,000	$ 40,100	$ 93,100	$ 1,263,600
Part B	16,514,900	226,700	2,541,500	1,371,300	20,654,400
Part C	6,671,900	165,100	1,211,700	777,300	8,826,000
Total	$ 24,301,200	$ 407,800	$ 3,793,300	$ 2,241,700	$ 30,744,000
Less Employee Contributions					-7,575,700
Normal Cost to State					$ 23,168,300
Past Service Liability --					
Police	$ 18,257,400	$ 114,400	$ 374,500	$ (140,100)	$ 18,606,200
Part B	263,202,100	2,077,900	27,791,600	5,929,200	299,000,800
Part C	193,953,200	1,335,200	12,288,000	1,926,300	209,502,700
Total Active Employees	$475,412,700	$ 3,527,500	$ 40,454,100	$ 7,715,400	$527,109,700
Pensioners					248,867,500
Total					$775,977,200
Less Assets in Fund					-40,735,300
Unfunded Past Service Liability					$735,241,900

* Assumes 3% annual general salary increases, 3% post-retirement pension increases, and a 7% investment yield.

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The costs are based on the following distribution of salaries and employees by plan. Excluded are employees with less than one year of service and employees who have not elected to be covered under the System.

	Number	Total Salary
Police	677	$ 6,628,700
Part B	22,349	183,182,300
Part C	7,548	61,308,400
	30,574	$251,119,400

The normal cost to the State is 8.5% ($21.4 million) of the payroll of participating employees with at least one year of service if inflation is excluded. With 3% general salary increases and 7% investment yield, the normal cost would be 9.2% ($23.2 million). The two figures are fairly close together because - in terms of normal cost - the increase in assumed interest earnings goes far toward offsetting the increase in projected benefits.

The past service liability for benefits earned before 1970 totals three-quarters of a billion dollars - $753,258,700. About 30% - $248,867,500 - of this represents the value of benefits to present pensioners. That sum of close to a quarter-of-a-billion dollars is the amount required to meet lifetime payments to present pensioners, if one were to assume no additional contributions. The calculation of that lump-sum takes account of the monthly benefit amount of each pensioner, the life expectancy of each pensioner, based on sex and attained age, and investment yield of 4% on the sum before it is expended in pension payments.

As an offset to this liability, there are assets in the State Employees' Retirement Fund of $40.7 million. The unfunded past service liability of the System is therefore $712.5 million. (This does not represent a deficit in the usual sense -- it is a calculated amount used to establish the required level of pension fund contributions.)

VII. FINANCING THE SYSTEM

The System is currently financed on a pay-as-you-go basis. The only reserve is the Retirement Fund of $40.7 million, accumulated out of employee contributions. It is, in fact, less than what accumulated employee contributions would amount to, having been used, in part, to pay pensions. Except for that relatively small accumulation - worth less than one-sixth of the liability to existing pensioners, not to speak of future pensioners - benefit payments are met by year-to-year appropriations.

The necessary appropriations will increase inevitably. Applying the actuarial assumptions about future experience, we have projected the likely levels of benefit payments and State appropriations for the next 20 years. The results are shown in Table 11. In summary:

> Assuming no general increase in salary levels (only individual progressions), State appropriations by 1990 will have to increase almost $3\frac{1}{2}$ times over present levels - from $13.8 million to $47.6 million.
>
> The assumption of no general increase in salaries is, of course, unrealistic. When we project general salary increases and cost-of-living increases in pensions at the rate of 3 percent a year, we find that by 1990, State appropriations to meet benefit payments will be more than six times their 1970 level - $93.3 million compared to $14.3 million.

Under a pay-as-you-go arrangement, the cost is bound to increase rapidly for many years into the future. The cost of a benefit provision enacted in any given year generally shows up in terms of its full cost about thirty years later. Consequently, a future generation of taxpayers is required to pay for the pensions earned by employees rendering services to the present generation of taxpayers. The reliance is on the power of taxation to raise the necessary funds when they are required.

Table 11

Projected Pay - As - You - Go Costs

Year	Basic Calculation*		Alternative Calcuation**	
	Total	State's Share	Total	State's Share
1970	$21,288,100	$13,837,300	$ 21,938,400	$14,260,000
1971	23,952,000	16,287,400	25,459,600	17,312,500
1972	26,698,400	18,688,900	29,289,800	20,502,900
1973	29,791,800	21,748,000	33,735,800	24,627,100
1974	33,511,300	25,133,500	39,179,000	29,384,300
1975	37,871,000	28,403,300	45,720,500	34,290,400
1976	39,704,300	29,778,200	49,486,300	37,114,700
1977	41,445,400	31,084,100	53,331,500	39,998,600
1978	43,184,700	32,388,500	57,368,000	43,026,000
1979	44,586,500	33,439,900	61,156,300	45,867,200
1980	46,222,200	34,666,700	65,465,300	49,099,000
1981	47,895,900	35,921,900	70,053,500	52,540,100
1982	49,820,700	37,365,500	75,263,100	56,447,300
1983	51,778,200	38,833,700	80,795,700	60,596,800
1984	53,559,400	40,169,600	86,289,300	64,717,000
1985	55,447,800	41,585,900	92,273,400	69,205,100
1986	57,326,500	42,994,900	98,598,300	73,948,700
1987	59,176,800	44,382,600	105,124,800	78,843,600
1988	60,654,300	45,490,700	111,341,000	83,505,800
1989	62,149,300	46,612,000	117,913,500	88,435,100
1990	63,440,600	47,580,500	124,393,300	93,295,000

*Assumes no general salary increases or post-retirement pension increases

**Assumes 3% annual general salary increases and 3% annual post-retirement pension increases.

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There are three essential difficulties with pay-as-you-go financing. They have to do with (1) uncertainty of fulfillment, (2) recognition of cost, and (3) ultimate costliness.

As cost increases, there is the possibility that taxpayer rebellion in the future will force a search for ways and means of avoiding the full impact of the promised benefits. A reserve system which has spread the cost more evenly over the period when the benefit rights have accrued is more certain to fulfill completely the benefits promised by the plan. Apart from graduating cost, a funding arrangement accumulates reserves which are sufficient to fulfill pension obligations for an extended period of time, even if funding contributions are not made in full for a period of time.

The second consideration is that the absence of funding tends to eliminate a realistic price tag from proposed changes in benefit provisions. With a funded plan the actuary can make a realistic estimate of the actual long-term cost of various benefit improvements or other plan changes incorporated in legislative bills. When a plan is financed on a "pay-as-you-go" basis, experience indicates that price determination is usually abandoned and the legislature and administration do not have a built-in policy guide relating proposed changes in benefits to cost. Changes tend to be enacted without realistic confrontation with the ultimate cost impact. Under a funded plan, improvements in benefits can be intelligently determined after a conclusion has been reached as to whether or not they can be financed on a sound actuarial basis.

The third consideration is that funding helps materially to reduce cost because the investment yield on the reserves makes a significant contribution to the income ultimately needed to pay the benefits.

These reasons account for the long-term trend toward the funding of State employee retirement systems. As of January 1, 1970, there were only three State systems that were on a pay-as-you-go basis. Twenty-nine received contributions determined by actuarial calculation. Eighteen received contributions on some fixed basis (percentage of payroll) that results in the accumulation of substantial reserves.

The three pay-as-you-go systems were Connecticut, Massachusetts, and Delaware. Since then, Delaware has enacted legislation to assure actuarial funding.

We recommend that Connecticut legislate a funding requirement.

At what pace and on what schedule should the System be funded? There is a wide span of choices.

Let us first describe typical level funding schedules and then consider the merits of modifications.

Funding normally seeks to achieve both of the following objectives: (1) to accumulate assets sufficient (at some point) to fulfill benefit commitments if further contributions were to be discontinued, and (2) to level the required contributions over a prolonged period of years.

The level annual costs shown consist of the "normal cost" plus the cost of either meeting the interest payments on the accrued liability or amortizing the accrued liability over a certain period of years. Roughly speaking, the normal cost is the cost of benefit rights accruing on the basis of current service. Technically, as we have explained, the normal cost is the amount of contributions required each year, with respect to each employee, to accumulate over his working lifetime the reserves needed to meet the cost of benefit rights he has earned. The normal cost represents the ultimate cost of the Plan, if the accrued liability is amortized and the actual experience of the Plan conforms to the assumptions.

The normal cost to the State as of 1970, after deduction of expected employee contributions is 6.9% of total payroll for the State of about $310 million. As of the date of our valuation, that amounted to $21,385,800.

The accrued liability is the amount that would now be on hand if contributions sufficient to meet the costs of the Plan had been made each year in the past. If the Pension Fund had accumulated reserves equal to the accrued liability, the Plan could be referred to as being "fully funded". The reserves on hand would then be equal to prospective lifetime pension payments to the extent they had accrued or were currently payable on the basis of years of service to the date of the actuarial valuation. An actuarial calculation assigns a lump-sum present value to those prospective pension payments. The accrued liability consists of a liability for active employees plus a liability for pensioners.

If the accrued liability is not paid up, but the interest accrued on it is met, the accrued liability is prevented from growing over the years and remains as a perpetual "debt". The annual cost of an amortization program is greater than that for interest only funding because at the end of the specified amortization period the pension fund will have accumulated assets equal to its accrued liabilities.

The level annual costs to the State under various funding schedules are shown in Table 12 in dollar amounts and as percentages of total salary.

<u>Minimum Level Funding Versus Amortization</u>

A great majority of private pension plans and a number of plans for public employees are financed on the basis of contribution adequate to cover the normal cost of the plan and to amortize the unfunded accrued liability over a period of 15 to 40 years. When such a schedule of contributions is followed, it results at the end of the indicated period, if there have been no major changes in the plan or differences between actual experience and actuarial assumptions, in the existence of a fund which is equal to all of the accrued liabilities of the plan. In other words, if contributions were to be discontinued at that point, the value of the fund would be sufficient to pay all pensions and to make payments equal to the value of benefits accrued by active employees to the date of such termination. With private plans the logic of full funding is that such assets are desirable in order to provide security for the employees against the possibility of plan termination.

Table 12

Level Annual Costs to State of Connecticut
Under Various Funding Schedules*

(Amounts in thousands)

	Funding schedule							
	Interest only		50 - year amortization		40 - year amortization		30 - year amortization	
	Amount	% of salary	Amount	% of salary	Amount	% of salary	Amount	% of salary
Basic Calculation **	$48,800	15.7%	$53,300	17.2%	$56,000	18.0%	$61,000	19.6%
Alternative Calculation ***	71,300	22.9	73,000	23.5	74,700	24.0	78,500	25.3

*Based on cost factors and estimated total of annual salary rates as of December 31, 1969. Figures exclude any changes in salaries or pensions after that date.

**Assumes no future general salary increases, no post-retirement pension increases, and a 4% investment yield.

***Assumes 3% annual general salary increases, 3% post-retirement pension increases, and a 7% investment yield.

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With a system established by government, whether state or local, the prospect of termination is less realistic since government is an ongoing entity and has the power to tax to finance its obligations. Consequently, it is often considered less urgent for a public system to achieve full funding than it is for a plan in private industry.

However, there is, of course, value in funding the cost of a public plan so that the contributions will be level over a long period of years, if not in absolute dollar amounts per employee, then at least as a percentage of payroll. That goal can be achieved through a minimum funding scehdule that is technically identified as contributions equal to the normal cost of the plan plus the interest (at the assumed rate) on the unfunded accrued liability. The latter payment avoids any growth in the unfunded accrued liability. If contributions are made on such a minimum level funding schedule, they are generally sufficient, assuming the plan itself is static and circumstances do not change radically, to continue the plan in perpetuity; that is, at any point in the future contributions plus investment earnings on accumulated reserves will at least equal the benefit payments.

Such minimum level funding suffers over a period of time from two potential difficulties. One is that if there is a succession of liberalizations of the benefit plan or if benefits increase very substantially because of general salary changes, there results an increase in the unfunded accrued liability cumulatively so large as to make this schedule of payment insufficient for sustaining the plan in perpetuity. In other words, this minimum funding realizes its objective of level contributions adequate to finance the plan only as long as there is a reasonable balance between the unfunded accrued liability and the normal cost of the plan; a large change in benefit provisions or in salary levels over a period of time can undermine that necessary balance.

The second problem is that such a minimum funding basis does not assure a reasonable price tag on every proposed benefit change. If, for example, a benefit change affects almost exclusively past service or in general the accrued liability, rather than the normal cost of the plan, the minimum funding basis may lead to an understated estimate of cost with respect to the new feature.

Forty year amortization is, in our judgement, a reasonable objective around which to establish a schedule of funding for the System.

If this were to be launched, full blown, it would require an appropriation of 22.3% of covered payroll (18% of the total State payroll) - about $56,000,000 in the first year. (Actually more, considering salary increases since the date of valuation.)

So large an increase in the appropriation may pose too great a fiscal problem for the State at this time. There are alternatives.

Alternative Funding Schedules

The least expensive alternative would be for the State to make massive appropriations to the System - $100,000,000 or $200,000,000 or $300,000,000 - in one year or over a couple of years - essentially by borrowing the funds required. This could be done, theoretically, by borrowing to that extent for other State needs and appropriating the cash equivalent to the System or by donating bonds to the System which the System could sell. In the latter event, for the real value of this drastic means of funding to be realized, the System would have to sell the bonds and use the proceeds to buy corporate securities and mortgages.

The effect would be a dramatic reduction of ultimate cost to the State. The State would pay an interest rate of perhaps 5.5%. On that same money, the Retirement System would earn at least 8%. The difference would represent income on $100,000,000 of $2,500,000 a year. With compounding, based on the full investment yield of the System, the extra income would amount, over the years, to far more than $2,500,000 a year.

Even if the additional indebtedness were to raise the cost of future refinancing, the probabilities strongly favor a substantial net gain.

Moreover, this sudden funding would reduce the actuarial funding requirement. An extra $100,000,000 in reserves would reduce annual funding by $4,000,000 a year (the interest obligation - 4% - on the $100,000,000).

While this would be the most economical way for the State of Connecticut to meet the inevitable costs of its Retirement System, it is concededly a novel approach and clearly it runs the risk of being misunderstood. It may therefore prove to be too awkward to achieve at this point. An alternative must therefore be considered.

We recommend the following as one alternative:

1. The State adopt as its objective funding based on amortization of the unfunded past service liability over a period of 40 years.
2. 40-year funding be introduced gradually, over the next 11 years, through payment each year of the normal cost plus the following percentages of full 40-year amortization of the unfunded past service liability:

Future fiscal year	Percentage to be paid of full 40 - year amortization
First	0%
Second	10
Third	20
Fourth	30
Fifth	40
Sixth	50
Seventh	60
Eighth	70
Ninth	80
Tenth	90
Eleventh and subsequently	100

This schedule would begin the full 40 year period with the eleventh year. The goal of full funding would therefore be set for the fiftieth year.

The general effect of this schedule of gradually working into 40-year amortization is shown in Table 13 . The dollar amounts would be subject to considerable modification as payrolls increase and cost-of-living pension adjustments are made. However, the essential purpose of Table 13 is to show the general relationship between one series of appropriations and another. Cost under the graduated amortization schedule would start close to present pay-as-you-go cost and, in the eleventh year, climb to substantially more than the then-current benefit cost to the State.

It is possible to come closer to the actual dollar magnitudes for the first two fiscal years. Payrolls for those years have been projected and so have pension payments. The following compares State appropriations under the present pay-as-you-go policy with appropriations under the graduated amortization policy:

	Appropriations	
Year ended	Pay-as-you-go	Graduated amortization
June 30, 1972	$ 17 million	$ 23 million
June 30, 1973	20 million	27 million

Certain essentials underlying the recommendations for a graduated amortization schedule should be underscored.

The schedule is keyed to full funding. In so doing, it will reflect every cost added to the System.

In further pursuance of that principle, we recommend that the Legislature require that every bill affecting retirement benefits be accompanied by an actuarial estimate of cost based on normal cost plus 40-year amortization of the added unfunded accrued liability. The purpose is to join the consideration of benefit improvements to a consideration of the long-term cost.

Table 13

Projected Costs Based on Contribution
of Normal Cost Plus a Graduated Increasing
Past Service Payment*

Calendar Year	Normal Cost	Past Service Payment	Total Contribution	Contribution Pay-As-You-Go
1971	$21,385,800	-0-	$21,385,800	$16,287,400
1972	21,385,800	$ 3,600,000	24,985,800	18,688,900
1973	21,385,800	7,451,600	28,837,400	21,748,000
1974	21,385,800	11,511,600	32,897,400	25,133,500
1975	21,385,800	15,730,100	37,115,900	28,403,300
1976	21,385,800	20,051,800	41,437,600	29,778,200
1977	21,385,800	24,416,700	45,802,500	31,084,100
1978	21,385,800	28,762,000	50,147,800	32,388,500
1979	21,385,800	33,023,200	54,409,000	33,439,900
1980	21,385,800	37,135,500	58,521,300	34,666,700
1981 and thereafter	21,385,800	41,035,900	62,421,700	**

*These costs are illustrative based on salaries and data as of December 31, 1969. They do not take into account increases in total salaries or pensions after that date.

** Continues to increase in the future.

To launch that schedule in full might increase appropriation requirements too abruptly. Consequently, a step-rate process is suggested over the next 10 years. That permits ultimate cost implications to be tied to benefits while moderating the impact on any one budget.

This alternative 10-step funding schedule would increase the State's costs by $6 million the first year and $7 million the second. If it is determined that this is too substantial an increase for that State to assume under current conditions, we suggest consideration of a second alternative.

The cost of immediately going on payments of full normal cost plus 40 year amortization of the unfunded liability is 18% of payroll. The pay-as-you-go cost for fiscal 1971-72 is about 5.5% of payroll. Thus the following schedule would produce no increase over present costs in the first two years:

Future fiscal year	Percentage to be paid of normal cost plus full 40-year amortization
First	30%
Second	35
Third	40
Fourth	45
Fifth	50
Sixth	55
Seventh	60
Eighth	65
Ninth	70
Tenth	75
Eleventh	80
Twelfth	85
Thirteenth	90
Fourteenth	95
Fifteenth and thereafter	100

On this basis, the costs are $17 million and $20 million for the first two years.

(Note - The first alternative pays normal cost but graduates the past service amortization payment. The second alternative graduates the total payment -- normal cost as well as the amortization payment.)

We recommend that legislation be enacted to embark on actuarial funding of the System because it will relate future changes to their ultimate cost effects, reduce appropriations over the long-term and provide reassurance of benefit fulfillment.

VIII. PORTABILITY

There are several public employee retirement plans:

(1) State Employees' Retirement System
(2) Municipal Employees' Retirement System
(3) Retirement System for Teachers
(4) Police and Firemen Survivor's Benefit Fund
(5) State's Attorneys' Retirement Fund
(6) Probate Court Retirement Fund

Many municipalities (for example, Hartford and Stamford) have their own retirement plans which are independent of the Municipal System. In addition, many public employees are also covered under the Federal Social Security Act.

Because a number of systems are involved, a public employee changing jobs may also change retirement plans. In so doing, he may lose pension benefits. It is conceivable that an employee could work for 20 years for assorted governmental units in the State without having more than a token pension. It is presumably in the public interest for employees to be able to move among governmental employers without taking a large pension loss.

Our discussion of this problem will necessarily concentrate on the State, Municipal, and Teachers' Systems. These are the largest of the funds, and, because they cover a large proportion of the State's public employees, a solution with regard to them will eliminate most of the problem. We will, however, bring in the other systems and out-of-state governmental units insofar as it is possible.

"Portability" can take several forms. The principal ones are vesting, credit for other service,"purchase of service", and recognition for eligibility. Table 14 gives a description of portability under the present systems. In addition, having a single State-wide system for all employees may provide complete portability by itself. This approach is discussed in detail in the next section of the report.

Table 14

PORTABILITY PROVISIONS OF
CONNECTICUT PUBLIC EMPLOYEE RETIREMENT PLANS

State Employees: Provisions for purchased service as follows:

(a) Public school teaching service in Connecticut covered under the Teachers' System, at employee's election within five years of his employment of re-employment by the State. Ten years' State service required for such credit.

(b) Certain specified out-of-state and foreign teaching service at employee's election within one year of his employment by the State. Maximum purchase 10 years. Employee must get no pension benefit from former employer for such service. Two years of State service required for each one year purchased.

(c) University employees with prior service as hospital pharmacists. Same rules as (b), above.

(d) Probation officers with prior municipal service.

(e) Military service.

(f) Transferred county employees.

continued ......

(g) Prior service with another State, provided that State makes similar provision for former Connecticut employees. Same rules as (b), above.

(h) Various provisions for purchase of specific types of former municipal and other service.

In most cases, a contribution by the employee is required in order for him to get this additional credit. Such contribution is frequently specified as the amount he would have contributed, with interest; sometimes it is a specified percentage of his salary. In any event, the contribution required for purchase of such past service is much less than the value of the benefits being purchased.

Teachers: Provisions for purchased service as follows:

(a) State service at employee's election within five years of his employment as a teacher. Maximum purchase 10 years.

(b) Certain specified out-of-state teaching service at employee's election within five years of his employment if the other state makes similar provision for former Connecticut teachers. Maximum purchase 10 years.

(c) Military service.

(d) Various provisions for purchase of University of Connecticut and other service.

In most cases, some contribution by the employee is required in order for him to get this additional credit. As in the case of the State Employees' System, the contributions required are far less than the value of the benefits purchased.

continued ...

Table 14 - continued ...

Municipal Employees: Full service credit is given automatically upon transfer from employment covered under the State Employees' System, or any private municipal system in Connecticut. Credit also transfers automatically between employers participating in the Municipal Employees' System. In all cases the employees' previous contributions with 3% interest are transferred.

employee makes a purchase, because the value of the credit is generally about two to five times the employee contributions. There may be no guarantee that the other employer will provide the same rights to former State employees. Also, this requires positive action (including a financial contribution) by the employee within a defined time period.

There are a number of inequities in the present arrangements which might well be eliminated in any overall solution to the portability problem. These inconsistencies result in part from the differences in portability provisions and in part from benefit differences.

A State employee going to work for a "participating municipality" (that is, one that participates in the Municipal Employees' Retirement System) gets full credit for all his past service. However, the benefit accrual rates under Municipal Fund A are lower than the rates under the State System, so his total accrued benefit would immediately drop. If, in fact, such an employee already had the 10 years of service required for vesting, this situation could become even more inequitable. He might be better off to terminate State employment completely, retain his vested rights under the State plan, and then join the Municipal Plan as though he were a brand new employee. This is because his vested benefit under the State's plan could easily be higher than the Municipal Plan's benefit for the same period of service. The same would be true for a former teacher going to work for a participating municipality and for a Municipal member moving from a municipality in Fund B to one in Fund A. In fact, there is another, possibly greater, risk for an employee transferring to a municipality in Fund A. Fund A has a 30 year service requirement for vesting; the other plans only require 10 years of service. So a fully vested employee with, say, 15 years of service would immediately lose all his vested rights under his present plan if he transferred to Fund A. He could work 15 years for the State, then 10 for the municipality, and he would have no pension at all, whereas if he worked 15 years for the State and then quit to work in private industry he would eventually get a fairly good pension from the State. Thus, he would have been severely penalized for continuing to work in public employment. A municipal employee entering State or teaching service may be even more unfairly treated, since in general he cannot get credit for his municipal service unless he is vested under his present system. In general,

it can be said that the Municipal System gives credit for all Connecticut public employment, while the other Systems do not give credit at all for municipal employment.

Another strange situation may arise when a vested State employee transfers to the Teachers' System. He can purchase up to 10 years' credit for State service after he transfers. Presumably if he has 10 years' service, he will be vested under the State plan and so, presumably, will not need to purchase service under the Teachers' plan. But since benefits are based on the highest three years' salary, this is not necessarily true. If the former State employee had 15 years of State service, he would be vested in a benefit based on his current salary; if instead he withdraws his State contributions and purchases 10 years of service under the Teachers' System, that credit will be based on his higher final salary some years later. Thus, the transferred employee might do better to give up his vested rights to the pension for 15 years of service so that he could buy credit for 10 years of service at a higher salary. This is a strange situation, especially since the employee cannot tell for sure which is the correct decision until he reaches retirement and knows the amount of his highest three years' earnings.

As another example of a strange result, a new State employee can purchase out-of-state service, and if he later transfers to the Municipal System he will get credit for this service, even though he could not have gotten credit for the out-of-state service if he had gone directly into the Municipal System without first working for the State.

In short, then, the current arrangements for portability are inappropriate because of their lack of uniformity between Systems and because the benefits of the Systems are different and are based on the highest three years' earnings.

Recognition for Eligibility

Our recommended solution to the portability problem is to count service with all public employers in Connecticut in testing for eligibility for retirement, vesting, disability, and so forth, but for each System to pay benefits

based on its own provisions. Thus a person who worked five years in the Teachers' System and then five years under the State Employees' System would become vested in both systems (since he would have the necessary ten years of service). If he were then to go to a private employer, each system would vest him in the benefit for five years of service. The vesting and benefits in each system should be based on the highest three years' average salary from Connecticut public employment, regardless of where it was earned. This would be a comparatively simple and equitable procedure. It would result in each System paying the pension cost for service under that System, modified only be a "writing up" of the benefits to the level of the final "final average" salary. It gives the same treatment to employees going from State to municipal employment as it does to those going in the opposite direction. It means that a person who has always been in Connecticut public employment will get a pension benefit, and that benefit will be based on his highest Connecticut public earnings. Moreover, since the benefit for service with each employer will be based on the formula of the System in which that employer participates, there will be no sudden changes in accrued benefits, vesting rights, etc. when an employee changes jobs.

Whether this plan should be labelled "portability" is arguable; it deals with the basic problem through reciprocal recognition of service credits.

We would also recommend that legislation be enacted to include the private municipal systems in such a portability arrangement, since otherwise there will continue to be serious gaps in the overall portability protection.

Finally, we recommend that the present "purchased service" provisions be maintained for out-of-state service and leaves of absence, since these would not be covered by the eligibility crediting proposal.

We are unable to project the cost of such an arrangement, since we lack data on the extent of transfers of employees between public employers in Connecticut. Nonetheless, we can say that the cost impact should not be unsettling.

IX. UNIFORMITY

Should the State Employees', Municipal Employees', and Teachers' Systems be combined into a single State-Wide System? This may involve several aspects: (a) uniform benefits, (b) merged administration, and (c) merged funding. These are entirely separate questions; each can be achieved without either of the other two, except that there seems to be little sense to fund merger if benefits are not uniform and administration is separate.

The most significant of these questions is uniformity of benefits.

It would involve extensive revision of each plan of benefits and it would be expensive.

Table 15 gives a general description of various aspects of each of the present major systems. It is intended to give a broad picture of the Systems. It does not include special provisions for police, firemen, elected officials, and the like.

Uniformity of Benefits

If a single plan were to go into effect for all Systems, and covering all present employees, it would be difficult to avoid incorporating the most liberal benefits from each plan. Otherwise, some present employees might be hurt by the change. Each existing plan is the most liberal in some areas, but less liberal in others.

Differences in Social Security coverage also compound the difficulty. Most State employees (except police) are now covered by Social Security. On the other hand, teachers under the Teachers Retirement System and State police do not have Social Security. There are variations between the different municipalities as to who is, and who is not, under Social Security. Furthermore, some State employee chose not to come under Social Security when they were offered the opportunity to do so some years ago. A State-wide system would not really provide uniform benefits unless all employees also were treated identically with respect to Social Security.

Table 15

COMPARISON OF CONNECTICUT PUBLIC EMPLOYEE RETIREMENT PLANS

Item	State Employees	Teachers	Municipal Employees
Requirements for unreduced benefits	Age 65 (60 female) with 10 years of service or age 55 (50) with 25 service or age 70 (65) with 5 service	Age 60 with 20 years of service (including last 5 years) or any age with 35 service (including last 5)	Fund A: Age 65 with 15 years continuous service or any age with 35 service. Fund B: Age 55 with 10 continuous service or age 55 with 15 service or any age with 25 service
Amount of unreduced benefits	Part C: 2% of salary times service; $2\frac{1}{2}$% (maximum 20 years) for retirements after age 70 (65) if better. Part B: Same as A to age 65; after 65, benefit based on first $4,800 of salary is cut in half	2% of salary times service (maximum 75% of salary)	A: 1-2/3% of salary times service (if covered under Social Security, benefit based on salary up to Soc. Sec. wage base is cut in half). B: 2% of salary times service (if under Soc. Sec., use 1-1/6% on salary up to Soc. Sec. wage base) up to 33 years; change to 1% and 1/6% for service in excess of 33 years
Requirements for reduced benefits	Age 55 (50) with 10 service	Any age with 25 service (last 5 continuous) or total of age plus service at least equal to 80	A: Any age with 30 years service. B: Any age with 10 years continuous service
Requirements for vesting	Any age with (10) years service (last 5 continuous)	Any age with 10 years service (last 5 continuous)	A: Any age with 30 years service B: Any age with 10 years continuous service
Requirements for disability benefits	Any age, 10 service (no service requirement if job-related)	Any age, 10 service	Any age, 10 service (no service requirement if job-related)
Amount of disability benefits	50% of salary plus 2% of salary times service in excess of 25 years	Years service divided by 65, times salary	Same as unreduced benefits (not less than 50% of salary if job-related)
Pre-retirement death benefit	Refund contributions; if option is in effect, member is assumed to have retired	Lump sum of $500 to $1,000 plus dependents pension of $125 to $300 per month; if option is in effect, member is assumed to have retired; voluntary contributions refunded	Refund contributions; if option is in effect, member is assumed to have retired

continued ....

A uniform plan with the highest benefits would require extensive changes in present benefits. Municipal Fund B has unreduced benefits at age 55 with either 15 years of total service or 10 years of continuous service. An employee with 25 years of service can retire at any age without taking a reduction in his benefit accrual rate. All the other groups would have to liberalize their retirement rules considerably to match this provision. The State Employees' System, however, provides a pension after only five years of service to men age 70 and women age 65, while the other systems require at least 10, 15 or 20 years service in order for the employee to get some pension. Reduced benefits are available to Municipal Fund B employees at any age, as long as they have 10 years service and are willing to take a full actuarial reduction in their pension; the other systems either have an age requirement or require long service before an employee can receive a pension.

Part C of the State plan gives an unreduced benefit of 2% of salary per year of service, and in some cases even gives a $2\frac{1}{2}$% benefit. The Teachers' System has a similar formula, as does Municipal Fund B for employees not covered by Social Security. All other employees would get substantially higher benefits if the present Part C formula were made the uniform formula. The State system has a minimum disability benefit of 50% of earnings after 10 years of service; a teacher would need 33 years service and a municipal employee would need 25 to 30 years service to get an equivalent benefit.

The Teachers' System is the only one which has substantial pre-retirement death benefits (except for special cases such as police and firemen). The other systems only return the employee's contributions unless the employee has a survivor option in effect at the time of his death.

In summary, while there are some areas of similarity between the Systems (e.g., requirements for disability benefits and definition of earnings as the highest three years' average), every System is deficient in some areas and superior in some items in comparison to the others. To bring all Systems up to the same level would require expensive revisions in benefits.

We do not see a sufficiently compelling reason to recommend such a drastic step at the present time.

We might add the following note, however. Developments in many of the States have tended to provide interest in either uniformity of benefits or at least consistency of provisions among the public employers of a State. Differences which cannot be defended on the basis of legitimate differences in circumstances may generate a "whip-sawing" process that ultimately forces consideration of the desirability of one body of retirement law, a body that would provide uniformity except where distinguishable conditions of employment justify differences in eligibility or benefit formulas. That ultimate development is, however, a far-reaching change that is not, in our opinion, appropriate in a study such as this, centering on the merits of funding the State Employees' System.

Merged Funding

The Municipal System is basically a funded system. The Teachers' System is fully funded for retired members and unfunded for the rest. The State System is essentially unfunded. If all funds were combined, the two funded systems would be subsidizing the State System. It is possible, however, to have a single system but keep separate funds for sub-groups of that system. Thus municipalities could keep the funds they have paid for the sole benefit of municipal employees in a State-wide system.

Merged Administration

In the absence of uniform or much more consistent benefit provisions, there would be little advantage in a unified administration. The State and Municipal Systems are already administered by the Retirement Division. The Teachers' System is administered by the Teachers' Retirement Board. Investments are already handled centrally by the State Treasurer. Conceivably, record-keeping functions could be fully adapted to computers on a combined basis with some savings for technical services. This potential is not suffi-

ciently significant to justify unification.

Consequently, absent a consolidated retirement law, we see no clear value in unified administration.

APPENDIX A: DATA COLLECTION AND EDITING

A significant portion of the work on this report involved the assembling of data on active employees. This is because the present records of the State Employees' Retirement System are kept on several different types of cards, none of which are computerized. Instead, we met with various employees on the Personnel, Payroll, and Auditor's staffs to see what computerized information they have available.

We finally wound up using a combination of personnel and payroll data. The Personnel Department maintains a punch card file of State employees. From these records, we extracted employee numbers, names, dates of birth and employment, and sex. The date of employment was the "initial year of hire". This is subject to a number of possible errors. First, a person who had left State Service and returned later would still have his original date of hire shown, not his most recent one. Discussions with Retirement Division staff members indicated that this occurred only infrequently among people whose total service at retirement entitled them to a pension, so we made no correction for this. The second problem concerned "purchased service." Under some circumstances, a State employee may purchase credit for time when he was working for another public employer. Thus his date of hire would not reflect his total service credits. We received copies of all such purchases in 1969. Based on these records, we made a small upward adjustment in the calculated costs. The third problem relates to the records themselves. Midway through 1969, the Personnel Department ceased recording the date of hire for new employees, because it concluded that the problem of breaks in service eliminated much of the usefulness of this item. As a result, it was not possible to distinguish between those employees hired in late 1969 and those employees whose date of hire was unknown. By dividing the data into groups and comparing the 1969 hires with the 1968 hires, we were able to estimate the number of "unknowns" and make an appropriate adjustment in the costs for them.

From the Payroll Department, we received the final 1969 tape covering all individuals who received one or more paychecks from the State in 1969. From this we took the agency code, the retirement plan, the total 1969 earnings, and

the last date on which the employee was paid. We assumed that any employee who received a pay check after December 15, 1969 was an active employee on December 31, 1969. This gave 42,958 "active" employees.

We combined the Payroll and Personnel information into a single record for each employee number. This produced 35,700 records which were usable without further editing. The remaining records had various inconsistencies or duplications. In general, these were attributable to either two individuals having the same employee number or one individual receiving pay from more than one department during the year. By editing these records we eventually established reasonably usable data on the remaining 7,249 active employees.