

Annual Report of the

# Maine State Retirement System
# Maine Judicial Retirement System
# Maine Legislative Retirement System

For the Fiscal Year Ended
June 30, 1989

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STATE OF MAINE

**MAINE STATE RETIREMENT SYSTEM**

STATE HOUSE STATION #46
AUGUSTA, MAINE 04333-0046



March 15, 1990

Dear Member:

This edition of The Annual Report of the Maine State Retirement system for the year ended June 30, 1989, consists of two sections: the Annual Report of the Executive Director and the Actuarial Valuation of the System.

As of June 30, 1989, the book value of the System's assets (including the Judicial and Legislative Retirement Systems) was $1,520.1-million as compared with $1,305-million on June 30, 1988. This represented an increase of $210.1-million in the book value of the System's assets over the fiscal year. The market value of System assets was $1,686.1-million and $1,405.8-million for the periods ending June 30, 1989 and 1988, respectively.

Net income from investments for fiscal year 1989, including funds distributed to the Judicial and Legislative Retirement Systems, was $125.3-million, an increase from the $94.7-million recorded a year earlier. This increase was due to gains from the sale of securities from $21.5-million in fiscal year 1988 to $44.3-million in fiscal year 1989. Dividend and interest income totalled $83-million compared to a fiscal year 1988 amount of $76.2-million. Deductions from investment income remained about the same at approximately $3.0-million for the fiscal year.

Contributions to the trust fund reserves from employers and employees during 1989 totalled $248.4-million, an increase from $232.2-million in 1988. The rate of employee contributions, set by statute, remained unchanged at 6.5 percent. In general, increased employer contributions were the result of salary increases coupled with additional amounts being contributed for the "old system" teachers.

Total outpayments during fiscal year 1989 were $167.7-million as compared with $155.0-million in 1988. Total receipts of $371.8-million exceeded payments by $204.1-million during the year.

The System's rate of return (interest, dividends, and capital gains), based on book value and cost of investments was 13.4 percent during fiscal year 1989 as compared with 8.42 percent the previous fiscal year.

Sincerely,

Claude R. Perrier

Claude R. Perrier, Executive Director
for the Board of Trustees
MAINE STATE RETIREMENT SYSTEM

# IN MEMORIAM

## Fred L. Kenney

## 1910-1989

This Annual Report is dedicated to the memory of Fred L. Kenney, a former member and chairman (1961-62) of the Board of Trustees of the Maine State Retirement System. Fred served a total of eighteen and one-half years (18½) on the Board of Trustees, from 1955 to 1962, representing the Maine State Employees Association, and from 1977 to June 1987, representing retired state and participating local district employees.

# Executive Director's Report

Annual Report of the Maine State Retirement System

ERRATA

EXECUTIVE SUMMARY
ANNUAL REPORT OF THE EXECUTIVE DIRECTOR

p. 2 Chart of ASSET ALLOCATION ACTUALS. The Market Value is as of 6/30/89 instead of 6/30/90 as printed.

p. 4 BENEFITS AND PLAN DESIGN. The last sentence in the first paragraph of the section should read "..in an effort to identify improvements wherever practicable, tempered by the additional costs to the taxpayers." The text, as printed, reads as two sentences.

# Maine State Retirement System
# EXECUTIVE SUMMARY
# ANNUAL REPORT OF THE EXECUTIVE DIRECTOR
# for the Fiscal Year ending June 30, 1989

June 30, 1989 ended the last fiscal year of the decade for the Maine State Retirement System. In many ways, this decade marks an extraordinary time period for the System in the areas of Plan Membership, Investments, and Administration.

*Funding Ratio Improved from 38 to 45 percent*

During this period, the Board's efforts to improve the financial condition of the System have proven very successful, resulting in a higher overall funding ratio. This ratio is an indicator of the System's financial health as it measures the relationship of assets to liabilities. For the year ended June 30, 1989, the ratio was approximately forty-five percent. Three years earlier, it stood at thirty-eight percent.

Although the System's financial health is improving, it remains vulnerable and is dependent on the State's commitment to pay required contributions on schedule to ensure a favorable long term outlook.

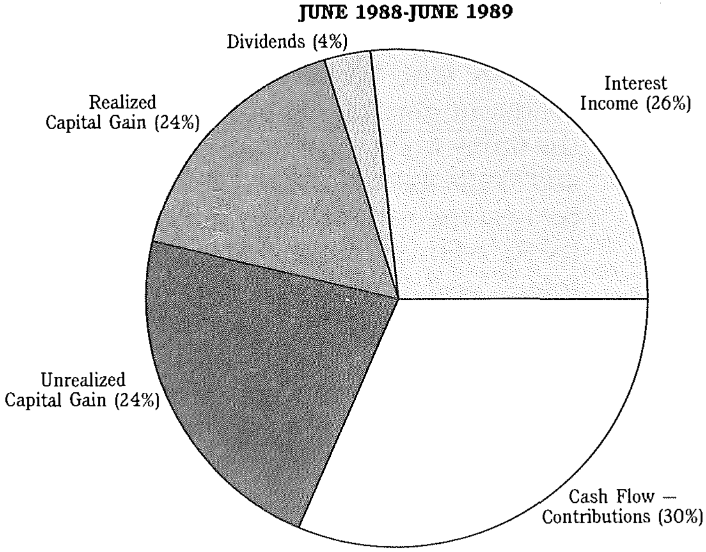
## INVESTMENTS

The investment portfolio continues to provide excellent returns, thereby contributing to the overall improvement in the System's financial picture.

*Return on Investment and Asset Growth Exceed Assumptions*

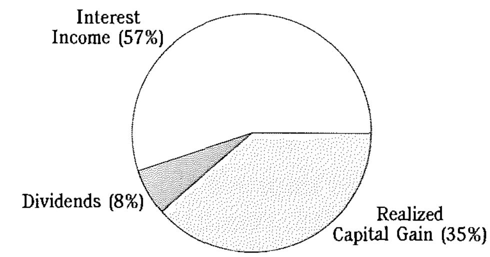
Returns for the year and five years ended June 30, 1989 were 13.4 percent and 15.4 percent respectively. For the same time periods, assets increased by $0.3- and $1.1-billion to a level of $1.7-billion. For comparative purposes, eight percent is the long term interest assumptions adopted by the board with a corresponding inflation rate assumption of six percent.

**Maine State Retirement System**
**CHANGE IN MARKET VALUE**
**JUNE 1988-JUNE 1989**

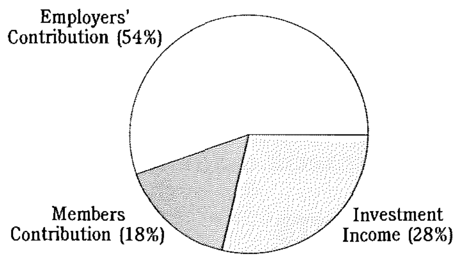



The increase in the System's *Market Value* during the past year was attributed primarily to realized and unrealized capital gains, net cash flow from contributions, and interest income. The increases associated with Capital Gains were largely the result of significant returns (25.3%) in the System's equity holdings, which currently represent more than forty percent of the overall portfolio.

**Maine State Retirement System**
**INVESTMENT INCOME**
**FISCAL YEAR 1989**




**Maine State Retirement System**
**TOTAL REVENUE**
**FISCAL YEAR 1989**



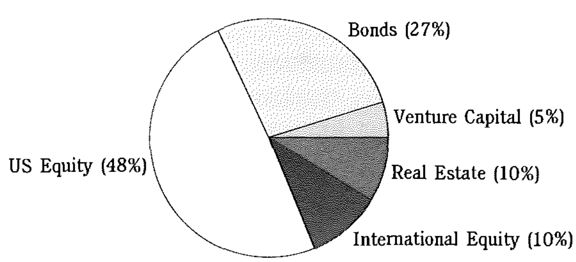

*Investment Income*, which excludes unrealized capital gains, was derived from a number of sources as noted at the left. A majority of the System's income for the fiscal year ended in 1989 was generated by the fixed income portion of the portfolio.

In reviewing the System's *Total Revenue*, employer contributions to the reserves accounts for 54 percent of the System's total income. Not surprisingly, investment income only accounted for twenty-eight percent of the income with the remainder coming from employee contributions.

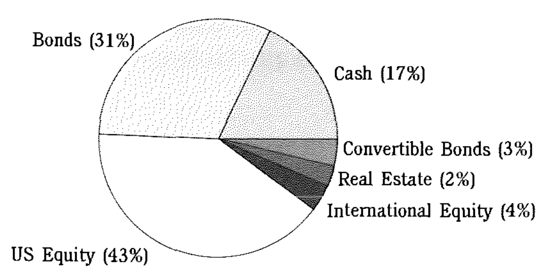
*Investment Income Expected to Increase*

However, as the System's funding program matures and the funding ratio improves, investment income is expected to increase as a percent of total revenue. In effect, the increasing significance of the income component will be a direct result of the relative growth in the asset base compared to liabilities. The Board, with the assistance of the investment committee, continues to pursue an active approach to formulating investment strategy and aggressively implementing investment programs on an ongoing basis.

**ASSET ALLOCATION PLAN**
**LONG TERM TARGETS**




**Maine State Retirement System**
**ASSET ALLOCATION MARKET VALUE 6/30/90**
**ACTUALS**




An *Asset Allocation Plan*, which was completed in May 1987 and is currently the mainstay of the investment strategy, is scheduled for review and revision, if necessary, in early 1990. The goal of this strategy is to broadly diversify the investment portfolio in order to mitigate the impact of a significant downturn in any single asset class (i.e., stocks, bonds, real estate, etc.) thereby adding stability to the investment returns. The portfolio's *Asset Allocation* for the fiscal year ended in 1989 is outlined at the left.

*Emphasis on Index Funds*

*Use of Specialized Account Managers*

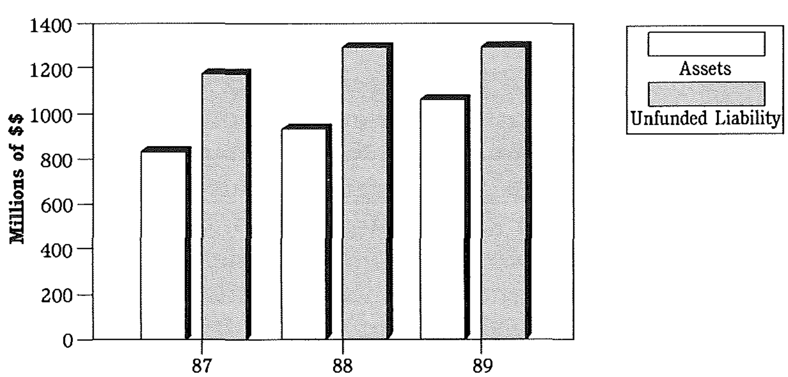
In keeping with the new investment strategy, the System began placing greater emphasis on the use of index funds. These funds provide the System with a broad market representation, resulting in core holdings within each asset class. Typically, the funds exhibit lower management fees and turnover while outperforming the average investment manager utilized under a separate account arrangement. However, the System continues to utilize the services of specialized separate account managers on a limited basis in the belief that this approach will result in overall added value to the portfolio.

Each investment manager's account is assigned a customized benchmark that is utilized to gauge performance over specific time periods. The individual benchmarks represent a collection of securities with unique portfolio characteristics, thereby allowing the Board to control exposure within various segments of the equity market. By employing managers with styles that parallel each benchmark, the resulting portfolios, as a whole, exhibit similar characteristics, allowing the Board to control the overall levels of risk.

*International Investments*

Also, with the concept of diversification in mind, the Board has initiated a program to invest 10 percent of the System's assets internationally, thereby focusing specifically on the overseas markets. This action recognizes the fact that significant investment opportunities exist in the Far East and European markets and should result in lowering the volatility of investment returns without incurring undue risk.

**Maine State Retirement System**
**INVESTED ASSETS VS. UNFUNDED LIABILITY**




**Fiscal Years Ending June 30**

## LIABILITIES

The System's unfunded accrued benefit reserve excluding PLD's) as of June 1989 was approximately $1.3-billion as compared to $1.2-billion two years earlier.

Although the unfunded balance has risen in that time period, assets have increased at a faster rate, resulting in an increase in the funding ratio from 41.0 percent to 44.8 percent presenting an improved financial picture.

*Employer Funding at Level Percent of Payroll*

An important objective identified by the Board when it formulated the investment strategy and actuarial assumptions was to develop a funding program that maintained a level percent of payroll. Although payrolls are expected to increase over time, the employer's contribution, presented as a percentage, remains constant. When the Board revised the actuarial assumptions in 1987 and modified the amortization period, the contribution rate was set at 19.38 percent. The rate is currently set at 19.68 percent, slightly higher but well within acceptable parameters. These results certainly suggest that the Board's objective is being achieved and will continue to do so into the future.

In spite of the system's favorable results during the past few years, the Board recognizes that the $1.3-billion unfunded accured benefit reserve is significant and will continue to monitor it closely into the future.

## BENEFITS AND PLAN DESIGN

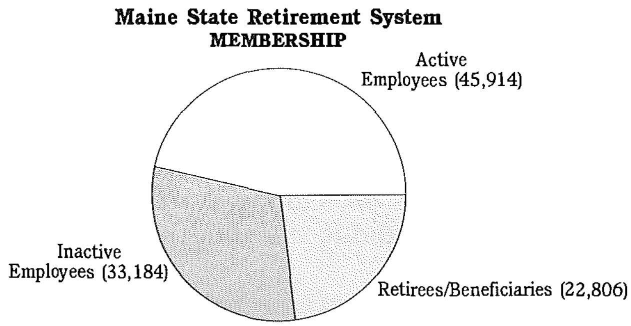
The Retirement System continues to offer a comprehensive package of employee benefits in the areas of retirement, Disability, Life Insurance and Survivors' Benefits. However, each year, the System and the Legislature review the programs in an effort to identify improvements wherever practicable. Tempered by the additional costs to the taxpayers.

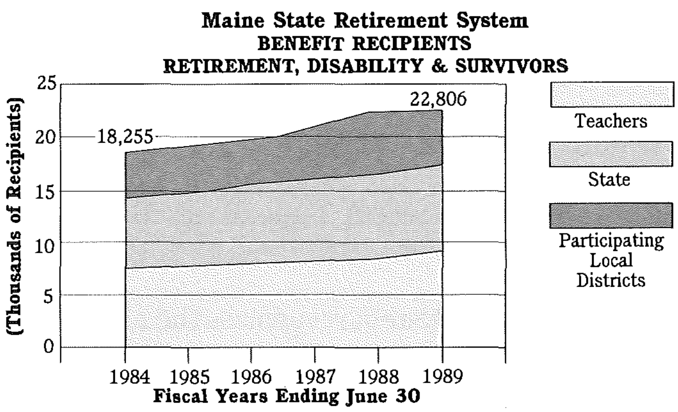
*Disability Retirement Program*

The most recent revision to Plan Design occurred in the Disability retirement program. In placing greater emphasis on the concept of reemployment, it now provides disabled employees with the opportunity to enroll in rehabilitation and retraining programs and become effectively reemployed where previously, the option did not exist. We are optimistic that as the program matures, both the employees and employers will benefit from this change in direction.

*Consolidation of Plans for PLD's*

Another important development is the Retirement System's continuing efforts, in conjunction with the participation of a number of different labor and management organizations, to formulate a realistic program to consolidate participating local district plans. This program, if successful, will significantly reduce the large number of existing plans into a smaller number of larger plans with enhanced portability for all participants, eventually incorporating teacher and state employee plans, if practicable. The Retirement System has introduced legislation into the 114th legislative session with the intent of obtaining the needed statutory revisions to enable implementation.




*Membership* in the retirement program continued to expand throughout the decade to its current level of 101,904 where as of June 30, 1980, it was 81,811. In addition to the growth of membership in existing plans, several new plans were established, legislative and judicial, resulting in expanded coverage and higher level of participation.

In conjunction with the growth in membership, the number of participants receiving benefit has also increased to a level of 22,806 with monthly payments totalling $157.5-million annually.

*Group Life Insurance*

The Retirement System continues to offer Life Insurance coverage to all public sector employees as well as retirees throughout the state. Current coverage exceeds $5-billion and continued growth in coverage is anticipated into the future. The program offers low cost, term coverage to all eligible employees, their spouses and qualified dependents. Recent administrative improvements and adequate loss reserves will assist the System in maintaining this important program at an affordable level for all employees.

*Social Security Intermediary*

The System also acts as the Social Security coverage agent for state and local governments. Although its responsibilities were reduced by the Omnibus Budget Reconciliation Act of 1986, the legislation did not relieve the System from the administrative costs of phasing out the collection and deposit responsibilities until April 1990. The System continues to assist employers in applying for Social Security and Medicare coverages and acting as intermediaries when questions arise.

## ADMINISTRATION

The administrative systems and procedures of the Retirement System had been evaluated in the mid-eighties and were deemed inadequate to meet current and future needs. Accordingly, the System embarked on an ambitious program to enhance and automate internal accounting systems and improve services to plan participants. The System has taken significant steps in achieving these objectives in the past few years.

*Computer Based Record Keeping System to be Installed*

A comprehensive, computer based record keeping system has been acquired and is currently being programmed to accommodate MSRS applications. The project is coordinated by in-house staff and is scheduled for completion by January 1991. As record keeping functions become automated, staff orientation will turn more toward membership and counseling and away from the traditional bookkeeping roles. The emphasis will continue to shift toward this service orientation throughout the nineties.

*Benefit Related Video Tapes for Members*

Again, in keeping with this concept of service orientation, the System undertook another initiative to develop a series of video presentations addressing specific benefit related issues. Once complete, the tapes will be available for wide distribution to plan participants and employers and will provide an understandable and succinct discussion pertaining to the major components of the MSRS benefit programs. This approach to the problem of information dissemination has been utilized by other public pension plans throughout the country with widespread success. Target dates for the completion of the initial tapes is June, 1990.

*New Management Information Programs*

As previously mentioned, the Retirement System recognizes the importance of establishing an effective communication network between itself and the plan participants and will continue to strive for improvements into the future. To this end, a new department has been established within the organization, Management Information Programs, scheduled for start-up in the first quarter of 1990. The Department's mandate will be to coordinate the distribution of all benefit related material in all media forms to insure accuracy and consistency of all information provided to the plan participants.

## SUMMARY

*Firm Commitment to Properly Fund*

The Retirement System is well poised for the nineties to improve the System's financial condition and the level of service to the plan participants. Participating employers, primarily state and local governments, have shown a firm commitment to properly fund their benefit obligations to insure adequate reserves as participants become eligible for benefits.

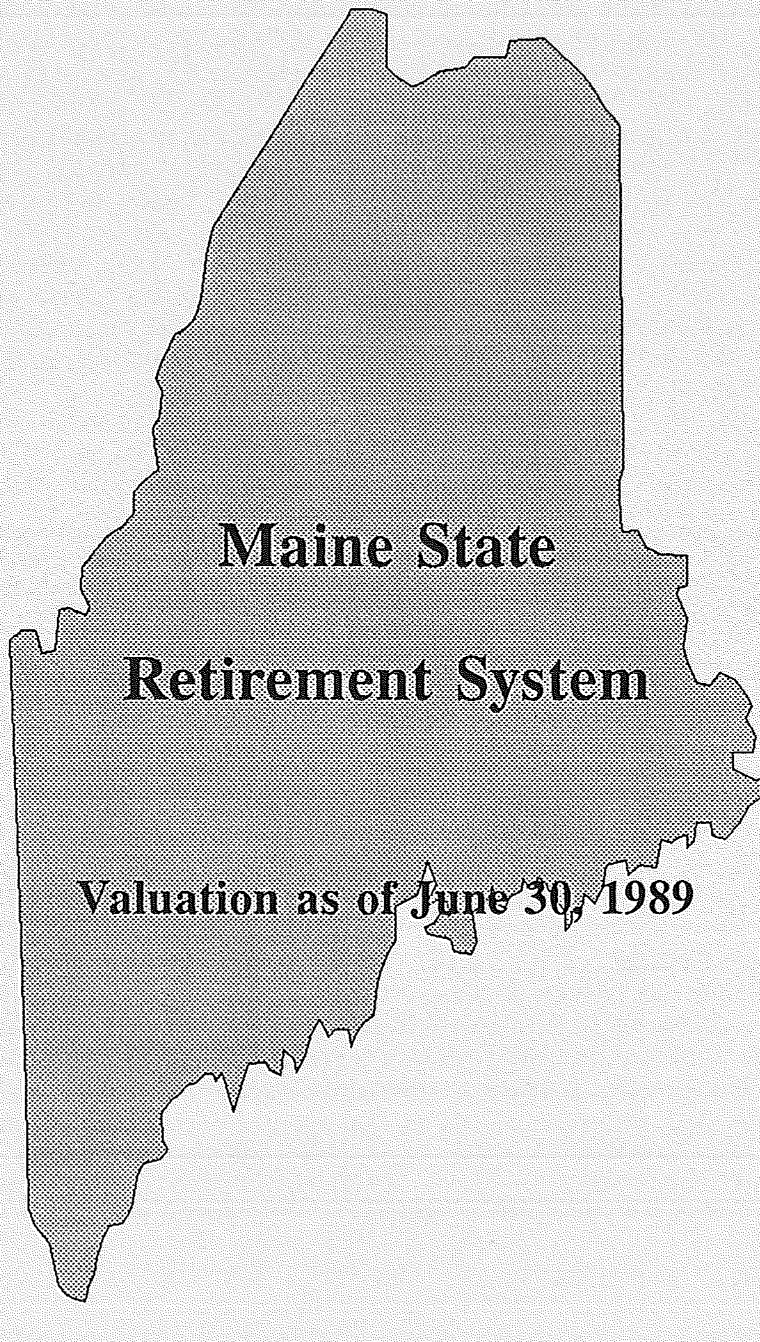
The significance of this commitment becomes more apparent when one considers that many employees are not covered by Social Security and therefore rely entirely on the Maine State Retirement System for their retirement and disability benefits.

*Investments Positioned for Maximum Return*

The investment portfolio is also well positioned to take advantage of the capital markets while taking into consideration the liability structure of the System. As we currently enjoy positive cash flow from contributions, the investment program can be designed to truly invest for the long term and hopefully maximize returns while maintaining an acceptable level of risk.

The Retirement System is optimistic about its ability to pay benefits while recognizing its obligation to the taxpayers in Maine to provide for equitable and reasonable funding of these programs into the future.

# Actuarial Valuation June 30, 1989



# Maine State

# Retirement System

## Valuation as of June 30, 1989

Milliman & Robertson, Inc.
Consulting Actuaries

Maine State Retirement System
ACTUARIAL CONSIDERATIONS OF THE PLAN
for the Fiscal Year Ended June 30, 1989

The Maine State Retirement System has retained Milliman and Robertson, Inc., as consulting actuaries and their report on an actuarial valuation of the System as of June 30, 1989 has been largely reproduced on the following pages.

The principal part of the report provides an Executive Summary and detailed sections on Assets, Liabilities, Contributions, and Reserves for Disability, Survivor and Accidental Death Benefits (Sections I through V).

Two sets of supplemental data are shown: Summary of Plan Provisions for State Employees and Teachers (Appendix B) and Actuarial Assumptions and Methods (Appendex C). The Membership and Data Profile has not been reproduced, however, much of the data are referenced in the statistical and Executive Director's sections of this report, offered earlier.

CONTENTS

# SECTION I
# EXECUTIVE SUMMARY

**Overview**

This report presents the results of our June 30, 1989 actuarial valuation of the Maine State Retirement System.

The major findings of the valuation are summarized in the following table:

| | June 30, 1989 | June 30, 1988 |
|---|---|---|
| Retirement System Contribution Rate (Without Participating Local Districts) | 19.68%* | 19.47%* |
| Market Value of Assets (Total System) | $1.68 billion | $1.40 billion |
| Actuarial Value of Assets (Total System) | 1.69 billion | 1.47 billion |
| Unfunded Actuarial Reserve (Without Participating Local Districts)** | $2.31 billion | $2.15 billion |
| Unfunded Accrued Reserve (Without Participating Local Districts)** | 1.31 billion | 1.30 billion |
| Accrued Benefit Funding Ratio | 44.8% | 40.1% |

Each of the 1989 figures differs from that which would have been expected, based upon the 1988 results. Details of this experience and additional findings of our valuation are presented later in this section. Please note that the Retirement System Contribution rates shown above are composite rates for the State Regular employees, MTRA Teachers, and the eight State special groups.

* *Rates do not include retiree health insurance charges, administrative expenses or payments to fund Old System Teachers.*

** *Figures for both years include an Old System Teachers Reserve of $0.23 billion.*

M&R

Following our comments are tables which compare the 1989 results with those developed in the 1988 valuation. We first present cost results relating to the combined state portion of the Systems, followed by corresponding results for the MTRA Teachers,State Regular employees, State special group employees, and Old System Teachers.

In the following sections of the report we present detailed results on System Assets (Section II), System Liabilities (Section III), System Contributions (Section IV), and the financial position of reserves for ancillary benefits (Section V). This report also contains three Appendices. Appendix A presents membership data and profiles and Appendix B provides a summary of System benefit provisions. Finally, an outline of all actuarial assumptions and procedures used in our valuation is contained in Appendix C.

## Valuation Comments

### Assets

As of June 30, 1989, the System has present funds, when measured on a market value basis, of $1.68 billion, an increase of $0.28 billion from a 1988 figure of $1.40 billion. When measured on a book value basis (cost), System assets increased to $1.52 billion in 1989 from $1.29 billion in 1988. Finally, for 1989 an actuarial value of assets was computed at $1.69 billion, as compared to $1.47 billion in 1988. All asset figures presented here include funds accumulated for retirement benefits, and ancillary benefits (death, disability, etc.) by the State System, Judicial and Legislative Systems, and Participating Districts. Section II presents more detailed information on System assets.

### Liabilities

Throughout this report there are two types of liabilities discussed, (1) Unfunded Actuarial Reserves, and (2) Unfunded Accrued Reserves. In Section III, we discuss in detail the different uses and definitions of these two terms. In general, Actuarial Reserves are calculated for purposes of determining future contributions, and are directly dependent upon the particular "funding method" used by the actuary. Use of different funding methods would provide entirely different results, when nothing else has changed (e.g., inflation, salaries, etc.) Since actuarial funding methods are used to determine costs for future retirement benefits, unfunded actuarial reserves will include future increases in pay and service credits. In this valuation, the "Entry Age Normal" method of funding was used.

As of June 30, 1989, the State's Unfunded Actuarial Reserve was $2.31 billion. This compares to a June 30, 1988 Unfunded Actuarial Reserve of $2.15 billion.

The second type of liability presented in this report is the Accrued Benefit Reserve. This represents the liabilities for all benefits paid in the future, based on members' earnings and service credits as of the valuation date. The difference between this figure and System assets represents the Unfunded Accrued Benefit Reserve. As of June 30, 1989 the Unfunded Accrued Benefit Reserve was $1.31 billion, as compared to a June 30, 1988 Unfunded Accrued Benefit Reserve of $1.30 billion.

More detailed information on System liabilities is presented in Section III.

**Contributions**

In Section IV of this report, we present detailed information on the development of State contribution rates to the System, calculated as of June 30, 1989. In addition, Section IV discusses the application of the State contribution rate for fiscal year budget purposes.

Contributions to the Systems consist of:

- a "normal contribution", for the portion of projected liabilities attributable to service of members during the year following the valuation date,
- an "unfunded actuarial reserve contribution", for the excess of projected liabilities allocated to service to date over assets on hand,
- a "disability benefit" contribution for the expected value of future disability (new law) benefits to be paid as a result of disablements occurring during the year following the valuation date, and
- a "death benefit" contribution (consisting of two parts: survivor benefits, and accidental death benefits) for the expected value of future death benefits to be paid as a result of deaths occurring during the year following the valuation date.

These rates, as a percentage of payroll, are summarized as follows (composite rate for all State employees and Teachers).

| | June 30, 1989 | June 30, 1988 |
|---|---|---|
| a. Normal Cost | 6.37% | 6.41% |
| b. Unfunded Actuarial Reserve | 11.50% | 11.31% |
| c. Disability Benefits | 1.49% | 1.49% |
| d. Death Benefits | | |
| (1) Survivor Benefits | 0.22% | 0.16% |
| (2) Accidental Death | 0.10% | 0.10% |
| e. Total Contribution | 19.68% | 19.47% |

The State contributions listed above do not include additional charges to cover retiree health insurance or administrative expenses, nor do they include payments for Old System Teachers.

**Membership**

The total membership (active, retired, and vested deferred) of the MSRS has increased by 3.3% from 52,005 as of June 30, 1988 to 53,719 as of June 30, 1989. The total annual payroll of active members has increased by 9.5% from $758 million as of June 30, 1988 to $830 million as of June 30, 1989.

In Appendix A, we present more information on the membership of the System.

**Overall System Experience**

The overall experience of the System was slightly less favorable than expected, based on actuarial assumptions first used in the 1987 valuation. The key indicator of overall experience in the System is the overall State contribution rate. These rates are being set so that they will be stable from year to year if experience is exactly as expected. An increase in the rate indicates unfavorable experience and a decrease, favorable experience during the previous year.

Two primary factors which contributed to the change in the System's assets, unfunded reserves and contribution rates between June 30, 1988 and June 30, 1989 were: (1) expected changes due to the passage of time, (e.g., new employees) and (2) unexpected changes due to experience gains and losses.

**Assets.**

Between June 30, 1988 and June 30, 1989, the assets of the Systems, measured on an actuarial basis, increased by $0.22 billion. This change was attributable to the following:

$248 million from employer and member contributions,

-$168 million from payment of benefits and expenses,

+$140 million from investment experience,

=$220 million total increase in assets.

Of this total change, $224 million was expected, based on our assumption that the assets of the Systems would earn 9.50%. However, the effective investment return on the actuarial value of the assets was about 9.25%, resulting in an actuarial loss of $4 million. On a market value basis, the assets of the Systems earned 13.91% or a gain of $64 million.

The asset loss (actuarial value) for the State employees and Teachers (including Old System Teachers) was $3 million.

**Unfunded Actuarial Reserves**

The actual increase in the unfunded actuarial reserve of the System (all State employees and Teachers, including Old System Teachers) between June 30, 1988 and June 30, 1989 was $156 million. This compares with an expected increase of $69 million, based upon the actuarial assumptions used in the valuations. The difference, $87 million, is attributable to the combined effect of asset losses, liability losses, the difference between expected and actual State contributions, and membership growth.

| | |
|---|---|
| Unfunded Actuarial Reserve, June 30, 1988 | $2,153 million |
| - increase expected | 69 million |
| - increase due to asset loss | 3 million |
| - liability losses, expected versus actual contributions, and membership growth | 84 million |
| Unfunded Actuarial Reserve, June 30, 1989 | $2,309 million |

**Contribution Rates**

The composite contribution rate for all State employees and Teachers increased from 19.47% of payroll as of June 30, 1988, to 19.68% of payroll as of June 30, 1989. The primary components of this change are shown below.

| | |
|---|---|
| Contribution Rate as of June 30, 1988 | 19.47% |
| Increase in Survivor Benefit Rate Due to Plan Change | + 0.08 |
| Asset Loss | + 0.01 |
| Liability Loss, Membership Growth, and Shifts in Payroll Among the State Employee and Teacher Groups | + 0.12 |
| Contribution Rate as of June 30, 1989 | 19.68% |

**Summary**

During the past year, the System experienced a slight increase in the overall contribution rate. This level of increase (0.21%) should be viewed as an insignificant deviation, so long as the increase is not a part of a consistent pattern of increases over several years. Since adoption of stronger actuarial assumptions just occured in 1987, any determination of a cost trend will not be made until at least 1990.

Finally, as long as there is a commitment by the State to pay required contributions on schedule, the long-term outlook for the System is favorable.

# REPORT OF THE ACTUARY ON THE VALUATION OF THE MAINE STATE RETIREMENT SYSTEM AS OF JUNE 30, 1989 (TOTAL)*

## SUMMARY OF PRINCIPAL RESULTS

| | June 30, 1989 | June 30, 1988 |
|---|---|---|
| 1. Participant Data | | |
| Number of: | | |
| Active Members | 36,916 | 35,714 |
| Retired Members and Beneficiaries | 16,193 | 15,721 |
| Vested Deferred Members | 610 | 570 |
| Annual Salaries of Active Members | $ 829,535,238 | $ 757,687,649 |
| Annual Retirement Allowances for Retired Members and Beneficiaries | $ 127,604,285 | $ 117,967,918 |
| 2. Assets and Liabilities | | |
| Actuarial Value of Assets | $ 1,067,805,978 | $ 916,275,619 |
| Unfunded Actuarial Reserve | 2,309,364,688 | 2,153,056,988 |
| Market Value of Assets | 1,062,778,812 | 870,575,284 |
| Unfunded Accrued Reserve | 1,311,093,671 | 1,301,347,945 |
| Accrued Benefit Funding Ratio | 44.8% | 40.1% |
| 3. Contribution Results as a Percent of Payroll (composite rate for all State employees and Teachers)** | | |
| Normal Cost | 6.37% | 6.41% |
| Unfunded Actuarial Reserve | 11.50% | 11.31% |
| Disability | 1.49% | 1.49% |
| Survivor Benefits | 0.22% | 0.16% |
| Accidental Death | 0.10% | 0.10% |
| Total | 19.68% | 19.47% |

* *Excludes participating local districts*

** *Excludes Old System Teachers, and charges for retiree health insurance and administrative expenses.*

M&R

# REPORT OF THE ACTUARY ON THE VALUATION OF THE MAINE STATE RETIREMENT SYSTEM AS OF JUNE 30, 1989 (MTRA)
# SUMMARY OF PRINCIPAL RESULTS

| | June 30, 1989 | June 30, 1988 |
|---|---|---|
| 1. Participant Data | | |
| Number of: | | |
| Active Members | 21,296 | 20,797 |
| Retired Members and Beneficiaries | 7,312 | 7,047 |
| Vested Deferred Members | 434 | 413 |
| Annual Salaries of Active Members | $478,479,650 | $ 433,983,539 |
| Annual Retirement Allowances for Retired Members and Beneficiaries | $ 64,199,840 | $ 59,097,773 |
| 2. Assets and Liabilities | | |
| Actuarial Value of Assets | $ 736,417,308 | $ 647,299,181 |
| Unfunded Actuarial Reserve | 1,297,936,880 | 1,180,458,881 |
| Market Value of Assets | 733,490,124 | 620,783,097 |
| Unfunded Accrued Reserve | 615,819,318 | 599,668,177 |
| Accrued Benefit Funding Ratio | 54.4% | 50.9% |
| 3. Contribution Results as a Percent of Payroll* | | |
| Normal Cost | 6.26% | 6.26% |
| Unfunded Actuarial Reserve | 12.44% | 12.15% |
| Disability | 1.50% | 1.50% |
| Survivor Benefits | 0.19% | 0.14% |
| Accidental Death | 0.08% | 0.08% |
| Total | 20.47% | 20.13% |

* *Excludes Old System Teachers, and charges for retiree health insurance and administrative expenses.*

# REPORT OF THE ACTUARY ON THE VALUATION OF THE MAINE STATE RETIREMENT SYSTEM AS OF JUNE 30, 1989 (STATE REGULAR)
## SUMMARY OF PRINCIPAL RESULTS

| | June 30, 1989 | June 30, 1988 |
|---|---|---|
| 1. Participant Data | | |
| Number of: | | |
| Active Members | 14,849 | 14,110 |
| Retired Members and Beneficiaries | 7,582 | 7,308 |
| Vested Deferred Members | 170 | 153 |
| Annual Salaries of Active Members | $ 327,783,073 | $ 301,255,669 |
| Annual Retirement Allowances for Retired Members and Beneficiaries | $ 50,847,310 | $ 46,448,425 |
| 2. Assets and Liabilities | | |
| Actuarial Value of Assets | $ 452,160,076 | $ 401,484,038 |
| Unfunded Actuarial Reserve | 669,673,995 | 632,209,572 |
| Market Value of Assets | 450,362,786 | 385,037,570 |
| Unfunded Accrued Reserve | 387,281,672 | 390,384,038 |
| Accrued Benefit Funding Ratio | 53.8% | 49.7% |
| 3. Contribution Results as a Percent of Payroll (State Portion only)* | | |
| Normal Cost | 5.91% | 5.96% |
| Unfunded Actuarial Reserve | 9.37% | 9.37% |
| Disability | 1.50% | 1.50% |
| Survivor Benefits | 0.27% | 0.20% |
| Accidental Death | 0.11% | 0.12% |
| Total | 17.16% | 17.15% |

* *Excludes eight special groups, and charges for retiree health insurance and administrative expenses.*

# REPORT OF THE ACTUARY ON THE VALUATION OF THE MAINE STATE RETIREMENT SYSTEM AS OF JUNE 30, 1989 (SPECIAL GROUPS) SUMMARY OF PRINCIPAL RESULTS

| | June 30, 1989 | June 30, 1988 |
|---|---|---|
| 1. Participant Data | | |
| Number of: | | |
| Active Members | 771 | 807 |
| Retired Members and Beneficiaries | 515 | 488 |
| Vested Deferred Members | 6 | 4 |
| Annual Salaries of Active Members | $23,272,515 | $22,448,441 |
| Annual Retirement Allowances for Retired Members and Beneficiaries | $6,631,329 | $6,037,153 |
| 2. Assets and Liabilities | | |
| Actuarial Value of Assets | $76,150,764 | $66,833,608 |
| Unfunded Actuarial Reserve | 112,783,479 | 105,241,665 |
| Market Value of Assets | 75,848,072 | 64,095,825 |
| Unfunded Accrued Reserve | 79,022,346 | 76,148,860 |
| Accrued Benefit Funding Ratio | 49.0% | 46.1% |
| 3. Contribution Results as a Percent of Payroll (State Portion only)* | | |
| Normal Cost | 15.28% | 15.19% |
| Unfunded Actuarial Reserve | 22.23% | 20.94% |
| Disability | 1.02% | 1.03% |
| Survivor Benefits | 0.22% | 0.17% |
| Accidental Death | 0.32% | 0.32% |
| Total | 39.07% | 37.65% |

**Excludes charges for retiree health insurance and administrative expenses.*

# REPORT OF THE ACTUARY ON THE VALUATION OF THE MAINE STATE RETIREMENT SYSTEM AS OF JUNE 30, 1989 (OLD SYSTEM TEACHERS) SUMMARY OF PRINCIPAL RESULTS

| | | June 30, 1989 | June 30, 1988 |
|---|---|---|---|
| 1. | Participant Data | | |
| | Number of: | | |
| | Active Members | 0 | 0 |
| | Retired Members and Beneficiaries | 784 | 878 |
| | Vested Deferred Members | 0 | 0 |
| | Annual Salaries of Active Members | $ 0 | $ 0 |
| | Annual Retirement Allowances for Retired Members and Beneficiaries | $5,925,806 | $6,384,567 |
| 2. | Assets and Liabilities | | |
| | Actuarial Value of Assets | $(196,922,170) | $(199,341,208) |
| | Unfunded Actuarial Reserve | 228,970,335 | 235,146,870 |
| | Market Value of Assets | (196,922,170) | (199,341,208) |
| | Unfunded Accrued Reserve | 228,970,335 | 235,146,870 |
| | Accrued Benefit Funding Ratio | -614.5% | -556.7% |
| 3. | Contribution Results as a Percent of Payroll | | |
| | Normal Cost | NA | NA |
| | Unfunded Actuarial Reserve | NA | NA |
| | Disability | NA | NA |
| | Survivor Benefits | NA | NA |
| | Accidental Death | NA | NA |
| | Total | NA | NA |

## SECTION II
## ASSETS

In this section we present the value assigned to assets held by the System. These assets are valued on three different bases; the book value, the market value, and the actuarial value.

**Book Value of Assets**

Table II-1 is a comparison, on a book value basis, of System assets as of June 30, 1989, and June 30, 1988, in total and by investment category. The book value is essentially the purchase price for equity investments and amortized value for fixed income investments such as bonds.

**Market Value of Assets**

For accounting statement purposes, System assets are valued at current market values. Briefly stated, these values represent the "snapshot" or "cash-out" value of System assets as of the valuation date. In addition, the market value of assets provides a reference point for comparison purposes. Table II-2 presents both book value and market value of total System assets by investment category as of June 30, 1989, and also shows the proportion of total assets by investment category for market value.

**Actuarial Value of Assets**

The market value of assets, representing a "liquidation" value of the funds, is not a good measure of the System's ongoing ability to meet its obligations. Ongoing funding requirements established using market values are subject to significant variability because of the volatility of market values.

As a consequence, actuarial valuations employ a technique for determining the actuarial value of assets which dampens the swings in market value. The specific technique adopted sets the actuarial value of assets by the following method:

**Step 1:** Determine the total yield on the investments of the System using the full investment return (including capital gains) measured by the difference in the actuarial value of the assets at the beginning of the fiscal year just ended and the market value of assets at the end of the year (8.75%).

**Step 2:** Calculate the excess of the yield determined in Step 1 over the expected yield for the same year according to the actuarial assumptions.
(8.75% - 9.50% = -0.75%)

**Step 3:** Calculate an adjusted rate equal to the expected rate plus one-third of the rate determined in step 2.
(9.50% + (1/3 * -0.75%) = 9.25%)

**Step 4:** The actuarial value of assets used in this valuation equals the amount that would have existed if the actual yield on the assets had been at the rate determined in Step 3.

**Allocation by Group**

Since retirement benefit costs are calculated separately for State Employees, Teachers and other Special Groups, total assets (market value and actuarial value) must be allocated to each of these groups. We have made this allocation as of June 30, 1989, in proportion to System reserves (provided at book value). The total for each group has been further allocated between the Member Contribution Fund and the Retirement Allowance Fund. The resulting allocations are shown in Tables II-3 and II-4.

**TABLE II-1**
**MAINE STATE RETIREMENT SYSTEM**
**ASSET COMPARISON AT BOOK VALUE**

| Asset Category | June 30, 1989 | June 30, 1988 | Increase (Decrease) |
|---|---|---|---|
| Bonds & Cash Equivalents | $652,961,511 | $721,095,821 | ($68,134,310) |
| Stocks | 676,227,707 | 274,391,601 | 401,836,106 |
| Commingled Funds | 187,791,185 | 171,991,721 | 15,799,464 |
| Mortgages | 61,958 | 70,541 | (8,583) |
| Land & Buildings | 2,301,368 | 1,838,686 | 462,682 |
| Other Assets | 805,568 | 128,746,240 | (127,940,672) |
| Other Liabilities | (3,972,036) | (4,678,983) | 706,947 |
| TOTAL | $1,516,177,261 | $1,293,455,627 | $222,721,634 |

**TABLE II-2**
**MAINE STATE RETIREMENT SYSTEM**
**BOOK AND MARKET VALUES**
**BY ASSET CATEGORY**
**(June 30, 1989)**

| Asset Category | Book Value | Market Value | Market Value % to Total |
|---|---|---|---|
| Bonds | $618,119,571 | $648,245,639 | 38.54% |
| Cash Equivalents | 34,841,940 | 34,841,940 | 2.07 |
| Stocks | 676,227,707 | 787,919,414 | 46.84 |
| Commingled Funds | 187,791,185 | 211,910,751 | 12.60 |
| Mortgages | 61,958 | 61,958 | 0.00 |
| Land & Buildings | 2,301,368 | 2,301,368 | 0.14 |
| Other Assets | 805,568 | 805,568 | 0.05 |
| Other Liabilities | (3,972,036) | (3,972,036) | -0.24 |
| TOTAL | $1,516,177,261 | $1,682,114,602 | 100.00% |

## TABLE II-3
## MAINE STATE RETIREMENT SYSTEM
## ALLOCATION OF
## MARKET VALUE OF ASSETS
## (June 30, 1989)

| | Allocation to: Member Contribution Fund | Retirement Allowance Fund | Total |
|---|---|---|---|
| **A. RETIREMENT RESERVES** | | | |
| State Employees | $201,665,654 | $324,545,204 | $526,210,858 |
| MTRA Teachers | 330,111,236 | 403,378,888 | 733,490,124 |
| Old System Teachers | 0 | (196,922,170) | (196,922,170) |
| Judges | 899,118 | 6,783,112 | 7,682,230 |
| Legislators | 140,132 | 442,668 | 582,800 |
| Subtotal State | $532,816,140 | $538,227,702 | $1,071,043,842 |
| Participating Districts | 91,373,554 | 322,757,981 | 414,131,535 |
| Total | $624,189,694 | $860,985,683 | $1,485,175,377 |
| **B. COMMINGLED RESERVES** | | | |
| Disability | $ 10,835,663 | $132,300,556 | $143,136,219 |
| Accidental Death | 0 | 6,085,601 | 6,085,601 |
| Survivor Benefits | 0 | 47,717,405 | 47,717,405 |
| Total | $ 10,835,663 | $ 186,103,562 | $ 196,939,225 |
| **C. TOTAL RESERVES** | $635,025,357 | $1,047,089,245 | $1,682,114,602 |

**TABLE II-4**
**MAINE STATE RETIREMENT SYSTEM**
**ALLOCATION OF**
**ACTUARIAL VALUE OF ASSETS**
**(June 30, 1989)**

| | Allocation to: Member Contribution Fund | Retirement Allowance Fund | Total |
|---|---|---|---|
| **A. RETIREMENT RESERVES** | | | |
| State Employees | $201,665,654 | $326,645,186 | $528,310,840 |
| MTRA Teachers | 330,111,236 | 406,306,072 | 736,417,308 |
| Old System Teachers | 0 | (196,922,170) | (196,922,170) |
| Judges | 899,118 | 6,813,770 | 7,712,888 |
| Legislators | 140,132 | 444,994 | 585,126 |
| Subtotal State | $532,816,140 | $543,287,852 | $1,076,103,992 |
| Participating Districts | 91,373,554 | 324,410,680 | 415,784,234 |
| Total | $624,189,694 | $867,698,532 | $1,491,888,226 |
| **B. COMMINGLED RESERVES** | | | |
| Disability | $10,835,663 | $132,871,779 | $143,707,442 |
| Accidental Death | 0 | 6,109,887 | 6,109,887 |
| Survivor Benefits | 0 | 47,907,834 | 47,907,834 |
| Total | $10,835,663 | $186,889,500 | $197,725,163 |
| **C. TOTAL RESERVES** | $635,025,357 | $1,054,588,032 | $1,689,613,389 |

## SECTION III
## LIABILITIES

**Actuarial Reserves**

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. There are several methods currently used in making such a determination.

The method used for this valuation is referred to as the "entry age normal actuarial cost method." Under this method, a level-percent-of-pay employer cost is determined which, along with member contributions, will pay for projected benefits at retirement for a new entrant into the plan. It is assumed applicable to all active plan members. The level percent developed is called the normal cost rate and the product of that rate and payroll is the normal cost.

The actuarial reserve is that portion of the present value of projected benefits that will not be paid by future employer normal costs or member contributions. The difference between this reserve and funds accumulated as of the same date is referred to as the unfunded actuarial reserve. If the employer's contributions exceed the employer's normal cost for the year, after allowing for interest earned on the previous balance of the unfunded actuarial reserve, this reserve will be reduced. Benefit improvements, actuarial gains and losses, and changes in actuarial procedures will also have an effect on the total actuarial reserve and on the portion of it that is unfunded.

After the amount of the unfunded actuarial reserve has been determined, a schedule of contributions is established to amortize that amount over a given period. Effective with the 1987 valuation, a thirty year amortization period was adopted. Payments to fund the actuarial reserve will be a level percentage of payroll.

**Accounting Statement Information - Accrued Benefit Reserves**

To give an understanding of the current funded status of the System, and to provide a basis for judging year-to-year progress in funding the obligations accrued by the System, certain supplemental accounting information based on two similar accounting statements is prepared. These statements are Opinion No. 8 of the Accounting Principles Board of the American Institute of Certified Public Accountants, (as amended by Statement No. 36 of the Financial Accounting Standards Board), and Statement No. 35 of the Financial Accounting Standards Board.

These statements specify that a comparison of the present value of accrued (accumulated) benefits with the market value of the assets as of the valuation date must be provided. As directed by the above-referenced accounting statements, these present values do not include any projection for future service and salary. (The actuarial reserves discussed in the preceding paragraphs, which are used to determine annual System contributions, do include projections for future service and salary.)

It is important to note two significant differences with respect to actuarial reserves and present value of accrued benefits.

**Future Pay Increases**

The actuarial reserve is determined as the portion of the value of the projected benefit at retirement including future pay increases that will not be paid by future employer normal costs or member contributions.

The present value of accrued benefits for accounting statement purposes represents the value of the annual benefit accrued as of the valuation date, assuming each member terminates employment at that time, and therefore it does not include future pay increases.

**Continuation of System**

In determining the actuarial reserves for cost determination purposes, we assume that the System is ongoing and that members will continue to accrue service in the future.

On the other hand, the present value of accrued benefits for accounting statement purposes provides a "snap shot" view of benefits accrued as of the valuation date assuming the System is terminated and no future benefit accruals or contributions will take place. For those reasons the Accrued Benefit Reserve represents the true "liability" of the System in the common definition of the word.

In Table III-1, we have summarized, as of June 30, 1989, the System's actuarial reserves, both funded and unfunded. Table III-2 shows the present value of accrued benefits, compared with System assets, as required for accounting statement purposes.

A separate report will provide the disclosure information required in accordance with Statement No. 5 of the Governmental Accounting Standards Board.

**TABLE III-1**
**Maine State Retirement System**
**Actuarial Reserves**
**as of June 30, 1989**

| | STATE EMPLOYEES | MTRA TEACHERS | OLD SYSTEM TEACHERS | ALL STATE EMPLOYEES |
|---|---|---|---|---|
| 1. Active Employees | | | | |
| (a) Current accrued benefits | $ 367,135,829 | $642,257,229 | $ 0 | $1,009,393,058 |
| (b) Future benefit accruals | $731,301,282 | $1,310,481,479 | $ 0 | $2,041,782,761 |
| (c) Total active projected benefits | $ 1,098,437,111 | $1,952,738,708 | $ 0 | $3,051,175,819 |
| 2. Inactive Employees | $625,379,047 | $707,052,213 | $32,048,165 | $1,364,479,425 |
| 3. Total Present Value of Projected Benefits (1 + 2) | $1,723,816,158 | $2,659,790,921 | $32,048,165 | $4,415,655,244 |
| 4. Future Contributions | $413,047,844 | $625,436,733 | $ 0 | $1,038,484,577 |
| 5. Actuarial Reserve (3 - 4) | $1,310,768,314 | $2,034,354,188 | $32,048,165 | $3,377,170,667 |
| 6. Invested Assets (Actuarial Value) | $528,310,840 | $736,417,308 | $(196,922,170) | $1,067,805,978 |
| 7. Unfunded Actuarial Reserve (5 - 6) | $782,457,474 | $1,297,936,880 | $228,970,335 | $2,309,364,689 |

## TABLE III-2
## Maine State Retirement System
## Accrued Benefit Reserves
## as of June 30, 1989

| | STATE EMPLOYEES | MTRA TEACHERS | OLD SYSTEM TEACHERS | ALL STATE EMPLOYEES |
|---|---|---|---|---|
| 1. Present Value of Accrued Benefits | | | | |
| (a) Employees terminated with vested rights | $4,613,892 | $11,497,634 | $ 0 | $16,111,526 |
| (b) Retired employees | 620,765,155 | 695,554,579 | 32,048,165 | 1,348,367,899 |
| (c) Active employees | 367,135,829 | 642,257,229 | 0 | 1,009,393,058 |
| (d) Total | $992,514,876 | $1,349,309,442 | $32,048,165 | $2,373,872,483 |
| 2. Invested Assets (Market Value) | $526,210,858 | $733,490,124 | $(196,922,170) | $1,062,778,812 |
| 3. Unfunded Present Value of Accrued Benefits ( 1 - 2) | $466,304,018 | $615,819,318 | $228,970,335 | $1,311,093,671 |
| 4. Accrued Benefit Funding Ratio (2 / 1) | 53.0% | 54.4% | NA | 44.8% |

## SECTION IV
## CONTRIBUTIONS

### General Comments

Under established procedures, contribution rates based on this June 30, 1989, actuarial valuation will be used to determine Fiscal Year 1991 State appropriations to the Maine State Retirement System. In this context, the term "contribution rate" means the percentage which is applied to a particular active member payroll to determine the actual contribution amount (i.e., in dollars) for the group to which the active member payroll applies.

### Description of Rate Components

Except for ancillary benefits (disability, survivors' and accidental death benefits), the Entry Age Normal method was used to develop the contribution rates in this section. Under this funding method, as with most other actuarial funding methods, a total contribution rate is determined which consists of two elements: the normal cost rate and the unfunded actuarial reserve rate. The contribution rates for ancillary benefits were determined separately using a term cost method. These elements are described in more detail below.

#### Normal Cost Rate

For State Employees, Teachers (MTRA) and each Special Group, an individual entry age normal cost rate was determined for a typical new entrant of each respective group. This rate was determined by taking the value, as of age at entry into the plan, of the member's projected future benefits, reducing it by the value of future member contributions, and dividing it by the value, also as of the member's entry age, of his expected future salary. The normal cost rate, so determined separately for each group, was assumed applicable to all active members of the group.

#### Unfunded Actuarial Reserve Rate

The unfunded actuarial reserve under the Entry Age Normal method equals the present value, at time of valuation, of future benefits less the present value of future normal costs, future member contributions and current assets. The unfunded actuarial reserve rate (or amortization rate) is the level percent of active member payroll which, when applied to each year's payroll, is sufficient to amortize the unfunded actuarial reserve over 30 years from June 30, 1987.

### Ancillary Benefit Rate

For each separate cost group (State Employees, Teachers, etc.) the cost of claims expected to be incurred during the year was determined as a percent of active member payroll. The State appropriation for ancillary benefits will then be determined by applying the ancillary benefit rate to the appropriate active member payroll.

## Total Contribution Rate Summary

In Table IV-1 we present total contribution rates, determined as of June 30, 1989, applicable for determining the Fiscal Year 1991 State appropriations to the System, using the cost methods described above. These were developed using actuarial assumptions and methods described in Appendix C.

The derivations of the unfunded actuarial reserve rates for each group are shown in Table IV-2.

# TABLE IV-1
# MAINE STATE RETIREMENT SYSTEM
# RECOMMENDED
# STATE CONTRIBUTION RATES*
# FISCAL YEAR 1990/1991

| | RETIREMENT BENEFITS | | ANCILLARY BENEFITS | | | |
|---|---|---|---|---|---|---|
| | NORMAL COST** | UNF ACTRL RESRV | DISAB | SURV | ACC DEATH | ALL BENEFITS |
| STATE EMPLOYEES | 5.91% | 9.37% | 1.50% | 0.27% | 0.11% | 17.16% |
| SPECIAL GROUPS | | | | | | |
| State Police (Closed Plan) | 20.00% | 30.94% | 0.75% | 0.16% | 0.23% | 52.08% |
| State Police (Open Plan) | 20.00% | 0.00% | 0.75% | 0.08% | 0.15% | 20.98% |
| Sea and Shore Wardens (Closed Plan) | 17.50% | 32.80% | 0.73% | 0.17% | 0.21% | 51.41% |
| Game Wardens (Closed Plan) | 20.00% | 37.13% | 0.69% | 0.18% | 0.22% | 58.22% |
| Prison Wardens (Closed Plan) | 8.00% | 12.76% | 1.57% | 0.34% | 0.53% | 23.20% |
| Prison Wardens (Open Plan) | 8.00% | 0.00% | 1.00% | 0.13% | 0.26% | 9.39% |
| Liquor Inspectors (Closed Plan) | 8.00% | 12.78% | 1.59% | 0.37% | 0.58% | 23.32% |
| Forest Rangers (Closed Plan) | 7.50% | 19.03% | 1.57% | 0.48% | 0.55% | 29.13% |
| MTRA TEACHERS | 6.26% | 12.44% | 1.50% | 0.19% | 0.08% | 20.47% |

* These rates do not include charges to cover retiree health insurance or administrative expenses

** Includes cost of automatic Option 2

# TABLE IV-2
# MAINE STATE RETIREMENT SYSTEM
# JUNE 30, 1989, VALUATION
# DERIVATION OF UNFUNDED ACTUARIAL RESERVE RATES

| | STATE REGULAR | STATE POLICE* | SEA AND SHORE WARDENS | GAME WARDENS | PRISON WARDENS* | LIQUOR INSPECTORS | FOREST RANGERS | MTRA TEACHERS |
|---|---|---|---|---|---|---|---|---|
| 1. Present Value of Future Benefits | 1,507,419,002 | 110,214,446 | 13,715,509 | 43,591,998 | 30,573,633 | 2,539,848 | 15,761,722 | 2,659,790,921 |
| 2. Normal Cost Rate** | 5.50% | 20.00% | 17.50% | 20.00% | 8.00% | 8.00% | 7.50% | 6.00% |
| 3. Present Value of Future Payroll | 3,213,209,402 | 50,684,168 | 4,233,883 | 8,246,032 | 50,143,542 | 2,917,686 | 13,355,508 | 5,002,456,296 |
| 4. Present Value of Future Normal Costs: (2) x (3) | 176,726,517 | 10,136,834 | 740,930 | 1,649,206 | 4,011,483 | 233,415 | 1,001,663 | 300,147,378 |
| 5. Present Value of Future Member Contributions | 208,858,414 | 3,801,312 | 317,541 | 618,452 | 3,760,764 | 189,650 | 1,001,663 | 325,289,355 |
| 6. Actuarial Reserve: (1) - (4) - (5) | 1,121,834,071 | 96,276,300 | 12,657,038 | 41,324,340 | 22,801,386 | 2,116,783 | 13,758,396 | 2,034,354,188 |
| 7. Actuarial Value of Assets | 452,160,076 | 38,804,579 | 5,101,474 | 16,655,954 | 9,190,197 | 853,179 | 5,545,381 | 736,417,308 |
| 8. Unfunded Actuarial Reserve: (6) - (7) | 669,673,995 | 57,471,721 | 7,555,564 | 24,668,386 | 13,611,189 | 1,263,604 | 8,213,015 | 1,297,936,880 |
| 9. Estimated Payroll | 327,783,073 | 10,309,709 | 1,056,643 | 3,047,401 | 6,425,800 | 453,643 | 1,979,319 | 478,479,650 |
| 10. Amortization Factor | 21.7995 | 21.7995 | 21.7995 | 21.7995 | 21.7995 | 21.7995 | 21.7995 | 21.7995 |
| 11. Unfunded Actuarial Reserve Rate (8) / (9) / (10) | 9.37% | 25.57% | 32.80% | 37.13% | 9.72% | 12.78% | 19.03% | 12.44% |

* Includes closed and open plans
** Does not include cost of Automatic Option 2

## SECTION V
## RESERVES FOR DISABILITY, SURVIVOR, AND ACCIDENTAL DEATH BENEFITS

Retirement benefits under the System are funded on a basis expected to result in level percent of pay contributions over the members' working lives. This funding method involves projecting the expected benefits payable in all future years, and spreading the costs to produce a level pattern.

In contrast, employer contributions for certain ancillary benefits are determined on a "term cost" basis. Under this funding method, the annual cost for a year is determined as the value of benefit claims expected to be "incurred" during the year.

For example, the value (or cost) of a survivor pension expected to become payable during a year is the present value of all the future monthly payments expected because of a member's death. Under the term cost method, the employer contribution reflects only the cost of events (deaths or disabilities) expected to occur in the current year.

Types of benefits under the System which are funded using the term cost method are the "new" disability benefit (effective in 1977), survivor benefits, and accidental death benefits. The cost of benefits for members who became disabled under the old provisions is funded along with retirement benefits.

For each of these benefits funded by the term cost method, a separate trust fund reserve is maintained. Each fund is increased by employer contributions and investment earnings and decreased by benefits paid.

Each year, as a part of the actuarial valuation we compare the present value of benefits payable (theoretical reserve) with the trust fund reserve (actual reserve). Under ideal circumstances the actual reserve will exceed the theoretical reserve to allow for a margin or "cushion" to absorb future experience losses. We show the trust fund at "actuarial value", as described in Part II.

Trends in the ratio of actual to theoretical reserves may indicate a need to change the assumptions used to value benefits which, in turn, will lead to a change in employer contribution rates. For example, this year we reduced the contribution rate for disability benefits by approximately 15% to reflect favorable experience in that fund.

The following sections compare the actual reserves with theoretical reserves based on an assumed rate of investment return of 8%.

**A. Disability Benefits Reserve**

| | |
|---|---|
| 1. Theoretical Reserve | |
| a. State Employees | $43,363,685 |
| b. Teachers | 38,476,877 |
| c. Participating Districts | 4,578,054 |
| d. Total | $ 86,418,616 |
| 2. Actual Reserve (Actuarial Value) | $143,707,442 |
| 3. Ratio: (2) / (1) | 166.29% |

**B. Survivor Benefits Reserve**

| | |
|---|---|
| 1. Theoretical Reserve | |
| a. State Employees | $ 20,095,754 |
| b. Teachers | 9,386,955 |
| c. Participating Districts | 2,816,715 |
| d. Total | $32,299,424 |
| 2. Actual Reserve (Actuarial Value) | $47,907,834 |
| 3. Ratio: (2) / (1) | 148.32% |

**C. Accidental Death Benefit Reserve**

| | |
|---|---|
| 1. Theoretical Reserve | $4,035,571 |
| 2. Actual Reserve (Actuarial Value) | $6,109,887 |
| 3. Ratio: (2) / (1) | 151.40% |

# APPENDIX B
# SUMMARY OF PLAN PROVISIONS - STATE EMPLOYEES AND TEACHERS

## 1. Membership

Membership is a condition of employment for state employees and teachers, and optional for elected and appointed officials.

Membership ceases on the earlier of withdrawal of contributions, retirement, and death.

## 2. Member Contributions

Except as otherwise described below, members are required to contribute 6.5% of earnable compensation.

Contribution requirements for special groups:

State police, inland fisheries and wildlife officers (game wardens),and marine resources officers (sea and shore wardens) employed before 9/1/84 - 7.5% of earnable compensation for 20 years; 6.5% thereafter.

State police and prison employees employed after 8/31/84 - 7.5% of earnable compensation for 25 years; 6.5% thereafter.

Forest rangers and state prison employees employed before 9/1/84 - 7.5% of earnable compensation until eligible for retirement; 6.5% thereafter.

## 3. Average Final Compensation

For purposes of determining benefits payable under the System, average final compensation is the average annual rate of earnable compensation for the 3 years of creditable service (not necessarily consecutive) which produce the highest such average.

## 4. Creditable Service

Creditable service includes service while a member, certain service prior to the establishment of the System, purchased military service credit, and service while receiving disability benefits under the System.

## 5. Service Retirement Benefits

Except as otherwise described below:

Eligibility for members in service - 25 years of creditable service, or attainment of age 60 with either 10 years of creditable service or one year of service immediately before retirement.

Eligibility for members not in service - 25 years of creditable service, or attainment of age 60 with 10 years of creditable service.

Benefit - 1/50 of average final compensation multiplied by years of membership service and up to 25 years of prior service, reduced for retirement before age 60.

Form of payment - life annuity.

If greater than the benefits produced by the standard formulas, the following benefits are available for special groups:

State police, inland fisheries and wildlife officers (game wardens), and marine resources officers (sea and shore wardens) employed before 9/1/84:

Eligibility - 20 years of creditable service in named positions.

Benefit - 1/2 of average final compensation plus 2% for each year of service in excess of 20. If greater, the pro-rated portion of the benefit for service before July 1, 1976 is based on annual pay instead of average final pay.

Form of payment - 50% joint and survivor annuity.

State police employed after 8/31/84:

Eligibility - 25 years of creditable service as a state police officer.

Benefit - same as for general employees, reduced for payment before age 55 rather than age 60.

Form of payment - life annuity.

Forest rangers employed before 9/1/84:

Eligibility - age 50 with 25 years of creditable service as a forest ranger.

Benefit - 1/2 of average final compensation plus 2% for each year of service earned after qualification for retirement. If greater, the pro-rated portion of the benefit for service before July 1, 1976 is based on annual pay instead of average final pay.

Form of payment - life annuity.

Airplane pilots employed before 9/1/84:

Eligibility - age 55 and 25 years of creditable service as an airplane pilot.

Benefit - greater of (1) 1/2 of average final compensation plus 2% for each year of service earned after qualification for retirement, and (2) if retiring after age 60, the benefit under the general formula.

Form of payment - life annuity.

Liquor inspectors employed before 9/1/84:

Eligibility - age 55 and 25 years of creditable service as a liquor inspector.

Benefit - 1/2 of average final compensation plus 2% for each year of service earned after qualification for retirement. If greater, the pro-rated portion of the benefit for service before July 1, 1976 is based on annual pay instead of average final pay.

Form of payment - life annuity.

State prison employees employed before 9/1/84:

Eligibility - age 50 and 20 years of creditable service as a prison employee.

Benefit - 1/2 of average final compensation plus 2% for each year of service earned after qualification for retirement.

Form of payment - life annuity.

State prison employees employed after 8/31/84:

Eligibility - 25 years of creditable service as a prison employee.

Benefit - same as for general employees, reduced for retirement before age 55 rather than age 60.

Form of payment - life annuity.

**6. Disability Retirement Benefits**

Eligibility - permanently mentally or physically incapacitated before normal retirement age while in service; unable to perform duties of own position.

Benefit - 66-2/3% of average final compensation, reduced by employment earnings over $10,000, and to the extent that the benefit, in combination with worker's compensation and Social Security, exceeds 80% of average final compensation.

Form of payment - payment begins on termination of service and ceases on cessation of disability or after 5 years, unless the member is unable to engage in any gainful activity; in which case payments cease on the earlier of 10 years following normal retirement age or date the service retirement benefit exceeds the disability benefit.

Conversion to service retirement - during the period of disability average final compensation is increased with cost-of-living adjustments and service is credited. On the date when service benefits reach a level of 66 2/3% of average final compensation or 10 years after the normal retirement date, if earlier, the disability benefit converts to a service retirement benefit based on service and pay at that point.

7. **Ordinary Death Benefits Before Eligibility for Service Retirement**

Eligibility - death while active or disabled before eligibility for service retirement.

Benefit - member's accumulated contributions at time of death. A surviving spouse, children, parents, or other beneficiaries may be eligible to elect (in lieu of contributions) survivor benefits in monthly amounts varying by number of eligible survivors.

8. **Ordinary Death Benefits After Eligibility for Service Retirement**

Eligibility - death while active or disabled after eligibility for retirement but before benefit commencement date.

Benefit - option 2 (see item 12) is automatically effective with benefits payable to designated beneficiary, spouse, or parents; however, beneficiary may elect benefit in item 7 instead. Otherwise, accumulated contributions are payable to the estate.

9. **Accidental Death Benefits**

Eligibility - death while active or disabled resulting from injury related to employment.

Benefit - if the member leaves no dependent children, 2/3 of the member's average final compensation to the surviving spouse until death; if there remain surviving dependent children, an annual sum of the member's final average compensation shared between dependent children and surviving spouse (if any). Benefits are reduced by amounts payable under worker's compensation.

## 10. Refund of Contributions

Eligibility - termination of service except by retirement or death.

Benefit - member's accumulated contributions with interest.

## 11. Cost-of-Living Adjustments

All retirement and survivor benefits are adjusted each year there is a percentage change in the Consumer Price Index, based on the Index. Cost-of-living adjustments are effective September 1 and are applied to all benefits which have been in payment for six months. The maximum increase or decrease is 4%. Earnable compensation used in determining benefits for disabled members is indexed similarly.

## 12. Optional Methods of Payment

Option 1: Cash refund equal to the excess of accumulated contributions at date of retirement over total payments made to date of death which are attributable to member contributions.

Option 2: 100% joint and survivor annuity.

Option 3: 50% joint and survivor annuity.

Option 4: Any other benefit which is actuarially equivalent to the retirement allowance and is approved by the board.

# APPENDIX C
# ACTUARIAL ASSUMPTIONS AND METHODS

## A. Actuarial Assumptions

| | | State Employees | Teachers |
|---|---|---|---|
| 1. Rate of Investment Return | 1989-90 | 9.0% | 9.0% |
| | 1990-91 | 8.5% | 8.5% |
| | 1991 + (ultimate) | 8.0% | 8.0% |
| 2. Cost-of-living Increases in Benefits | | 4.0% | 4.0% |
| 3. Rates of Salary Increase (% at Selected Ages) | Age | | |
| | 20 | 10.0 | 10.0 |
| | 25 | 8.8 | 8.8 |
| | 30 | 7.7 | 7.7 |
| | 35 | 7.2 | 7.2 |
| | 40 | 6.7 | 6.7 |
| | 45 | 6.2 | 6.2 |
| | 50 | 6.0 | 6.0 |
| | 55 | 6.0 | 6.0 |
| | 60 | 6.0 | 6.0 |
| | 65 | 6.0 | 6.0 |

*Includes 6% across-the-board increase at each age*

**A. Actuarial Assumptions**

| | | State Employees | | | Teachers | | |
|---|---|---|---|---|---|---|---|
| 4. Rates of Termination at Select and Ultimate Service (% at Selected ages)* | | Service | | | Service | | |
| | Age | 0-1 | 1-2 | 2+ | 0-1 | 1-2 | 2+ |
| | 20 | 40.0 | 20.0 | 15.0 | 30.0 | 20.0 | 15.0 |
| | 25 | 35.0 | 20.0 | 10.0 | 25.0 | 20.0 | 10.0 |
| | 30 | 30.0 | 15.0 | 8.0 | 25.0 | 20.0 | 8.0 |
| | 35 | 25.0 | 15.0 | 6.0 | 25.0 | 20.0 | 6.0 |
| | 40 | 25.0 | 15.0 | 4.5 | 25.0 | 20.0 | 4.5 |
| | 45 | 25.0 | 10.0 | 3.0 | 25.0 | 20.0 | 3.0 |
| | 50 | 25.0 | 10.0 | 2.5 | 25.0 | 20.0 | 2.5 |
| | 55 | 20.0 | 10.0 | 2.0 | 25.0 | 20.0 | 2.0 |

** Members with ten or more years of service and whose age plus service totals 60 or more are assumed to elect deferred vested benefits; other terminations are assumed to elect refunds*

| 5. Rates of Healthy Life Mortality at Selected Ages (number of deaths per 10,000 members)* | Age | Male | Female | Male | Female |
|---|---|---|---|---|---|
| | 20 | 5 | 3 | 5 | 2 |
| | 25 | 6 | 3 | 6 | 3 |
| | 30 | 8 | 5 | 7 | 4 |
| | 35 | 11 | 7 | 10 | 6 |
| | 40 | 16 | 9 | 14 | 8 |
| | 45 | 29 | 14 | 23 | 12 |
| | 50 | 53 | 22 | 42 | 18 |
| | 55 | 85 | 33 | 71 | 27 |
| | 60 | 131 | 55 | 109 | 44 |
| | 65 | 213 | 96 | 174 | 77 |
| | 70 | 361 | 165 | 292 | 129 |

** For State Regular and Teachers 5% of deaths assumed to be accidental; for State Special 20% of deaths assumed to be accidental*

## A. Actuarial Assumptions

6. Rates of Disabled Life Mortality at Selected Ages (number of deaths per 10,000 members)

| Age | State Employees Male | State Employees Female | Teachers Male | Teachers Female |
|---|---|---|---|---|
| 45 | 349 | 210 | 349 | 210 |
| 50 | 376 | 228 | 376 | 228 |
| 55 | 420 | 263 | 420 | 263 |
| 60 | 488 | 317 | 488 | 317 |
| 65 | 595 | 403 | 595 | 403 |
| 70 | 763 | 537 | 763 | 537 |

7. Rates of Retirement at Selected Ages (number retiring per 1,000 members)

| Age | State Employees | Teachers |
|---|---|---|
| 45 | 25 | 38 |
| 50 | 38 | 50 |
| 55 | 100 | 126 |
| 59 | 120 | 146 |
| 60 | 150 | 200 |
| 61 | 100 | 150 |
| 62 | 350 | 400 |
| 63 | 250 | 250 |
| 64 | 250 | 250 |
| 65 | 750 | 750 |
| 70 | 1000 | 1000 |

8. Rates of Disability at Selected Ages (members becoming disabled per 10,000 members)*

| Age | State Employees | Teachers |
|---|---|---|
| 25 | 5.7 | 5.7 |
| 30 | 6.3 | 6.3 |
| 35 | 7.3 | 7.3 |
| 40 | 11.0 | 11.0 |
| 45 | 22.0 | 22.0 |
| 50 | 42.0 | 42.0 |
| 55 | 71.9 | 71.9 |
| 60 | 124.2 | 124.2 |

**10% assumed to receive Workers Compensation benefits of 66 2/3% of pay; also, rates for State Special groups are higher by 7 per 10,000 at all ages.*

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9. Family Composition Assumptions

80% of active members are married with two children born at ages 24 and 28 (dependent until age 18); female spouse is three years younger than male spouse; no dependent parents; unmarried members have beneficiaries entitled to benefits worth 80% as much as those of married members' beneficiaries.

## B. Actuarial Methods

### 1. Funding Method

The aggregate entry age normal method is used to determine costs. Under this funding method, a total contribution rate is determined which consists of two elements, the normal cost rate and the unfunded actuarial reserve (UAR) rate.

For Teachers (MTRA) and State Employees, including each of the eight State Special groups, a normal cost rate is determined for a typical new entrant. This rate is determined by taking the value, as of age at entry into the plan, of the member's projected future benefits, reducing it by the value of future member contributions, and dividing it by the value, also as of the member's entry age, of his expected future salary.

In addition to contributions required to meet the System's normal cost, contributions will be required to fund the System's unfunded actuarial reserve. The actuarial reserve is defined as the present value of future benefits less the present value of future normal costs and future member contributions. The unfunded actuarial reserve is the total of the actuarial reserve for all members less the actuarial value of the System's assets. The actuarial reserve includes projections of future member pay increases and future service credits and should not be confused with the Accrued Benefit Reserve.

The unfunded actuarial reserve is amortized by annual payments over a 28 year period from July 1, 1989. The payments are determined so that they will be a level percentage of pay, assuming total pay increases 6% per year.

Costs for ancillary benefits (death and disability) are determined using a term cost method.

### 2. Asset Valuation Method

For purposes of the June 30, 1989 actuarial valuation, assets are valued at an "actuarial value" as described in Part II.