REPORT ON

ACTUARIAL VALUATION

MINNESOTA STATE RETIREMENT SYSTEM

DECEMBER 31, 1969

June 5, 1970

FILE COPY

COATES, HERFURTH & ENGLAND, CONSULTING ACTUARIES

COATES, HERFURTH & ENGLAND
CONSULTING ACTUARIES
301 EAST COLORADO BLVD.
PASADENA, CALIFORNIA 91101

OFFICES IN
SAN FRANCISCO
DENVER
PASADENA

TELEPHONE
AREA CODE 213 681-4455

June 5, 1970

Board of Trustees
Minnesota State Retirement System
530 North Robert Street
St. Paul, Minnesota 55101

Gentlemen:

We are pleased to transmit herewith our report on the actuarial valuation of your Retirement System made as of December 31, 1969.

Pursuant to Contract No. E-5206, under which this valuation was authorized, the actuarial valuation was carried out on the basis of a 3-1/2% interest rate assumption and on the basis of the other actuarial assumptions set forth in our report submitted to the Board on May 31, 1968. Also, in accordance with the above noted contract, we utilized the entry age normal cost method of funding to determine the unfunded accrued liability of the System.

Contract No. E-5206 authorized a second valuation to be carried out on the basis of a 3% interest assumption. The results of the "3% valuation" will be submitted in a separate actuarial report.

We hereby certify that the actuarial valuation of the Minnesota State Retirement System made as of December 31, 1969 was carried out on the basis of accepted actuarial methods and procedures and in accordance with the provisions of Minnesota Statutes 1967, Chapter 356. The results of that valuation indicate that the contributions required from the employees and from the State under Minnesota Statutes 1967, Chapter 352, as presently constituted are adequate to provide the benefits that will be paid from the System.

We look forward to the opportunity of discussing this report with you at your convenience.

Very truly yours,

COATES, HERFURTH & ENGLAND
Consulting Actuaries

By ____________________
Robert H. Little, F.S.A.

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REPORT ON

ACTUARIAL VALUATION

OF THE

MINNESOTA STATE RETIREMENT SYSTEM

AS OF

DECEMBER 31, 1969

SECTION I

INTRODUCTION

In accordance with Contract No. E-5206 between the State of Minnesota and this firm, we have completed the actuarial valuation of the Minnesota State Retirement System as of December 31, 1969.

The Executive Director of the System furnished us with detailed employee information on all active members, inactive members and retired members of the System as of December 31, 1969. The Executive Director and his staff are to be complimented on the accuracy and completeness of the aforementioned data.

The Executive Director also furnished us with a Financial Report setting forth the assets and liabilities of the Fund as of December 31, 1969.

No physical audit of these assets was made by us and our calculations are based upon the Financial Report as submitted.

This valuation is based on the System as it was constituted on December 31, 1969 and does not reflect any amendments to the System that may become effective subsequent to that date. The following four major amendments to the System became effective during 1969:

1. Change in Percentage Credit Per Year of Service

	Old	New	
		For Service to 7-1-69	For Service After 7-1-69
1st 10 years service	1%	1%	1%
2nd 10 years service	1%	1.1%	1.3%
3rd 10 years service	1.66%	1.7%	2.0%
4th 10 years service	1.75%	2.0%	2.5%

2. Reduction in State "Additional" contributions from 2% to 1-1/2% for 1969-70 and to 1% thereafter.

3. Establishment of the Minnesota Adjustable Fixed Benefit Fund for payment of benefits to retired persons.

4. Benefits to retired persons were increased by 3.56% to reflect the new 3-1/2% interest assumption.

The following Section II sets forth the results of the actuarial valuation and Section III contains the exhibits required by Chapter 356 of the Statutes. The schedules attached at the end of the report show the actuarial assumptions used in the current valuation which were developed during the course of the actuarial investigation carried out as of December 31, 1967. These schedules were requested by the Interim Commission in their "GVS Minnesota Memo #18".

SECTION II

RESULTS OF ACTUARIAL VALUATION

The contract under which this valuation was authorized specifies that the actuarial valuation be carried out on the basis of a 3-1/2% interest rate assumption and upon the actuarial assumptions developed during the course of the actuarial investigation carried out as of December 31, 1967. We were also instructed to carry out the actuarial valuation on the basis of an entry age normal cost method of funding. The current valuation was carried out in accordance with the stipulations contained in the aforementioned contract.

The entry age normal cost method of funding requires the determination of the level contribution rate which, if contributed on behalf of all new employees from the dates of employment to the dates of separation from service, will be adequate to provide all of their benefits. Under this funding method, the unfunded accrued liability is taken as the total liability of the System for benefits earned in the past as well as those earnable in the future, less the assets on hand, less the present value of future employee contributions and less the present value of future State entry age normal cost contributions.

In order to develop the entry age normal cost contribution rate for new employees, we carried out a complete valuation of active members as of December 31, 1969 who were employed during the preceding five-year period. The results of these calculations indicate that the total entry age normal cost rate under the new scale of benefits amounts to 5.59% of salary (5.01% under the old scale of benefits). Employees are required by law to contribute 3% and, accordingly, the State's share of the entry age normal cost contribution rate amounts to 2.59%. We expect the entry age normal cost rate to remain fairly stable unless there is a change in employment practices or in the Retirement Law.

The law requires that the State make the following contributions to the Fund with respect to members contributing at a 3% rate:

(1) A "matching" contribution equal to 3% of the members' salaries, and

(2) An "additional" contribution equal to one-half of members' contributions, or 1-1/2% of salary for the year commencing July 1, 1969 reducing to one-third of members' contributions or 1% of salary commencing July 1, 1970.

We have been advised that it is the intent of the Minnesota Legislature to pay the "additional" contributions referred to above for a limited time only.

The Accounting Balance Sheet shown on the following page was furnished by the Executive Director. The Retirement and Disability Reserve of $11,563,006.20 is to be transferred to the MAFB Fund.

The Actuarial Balance Sheet shown on the page following the Accounting Balance Sheet summarizes the results of the valuation. In the current valuation we have made provision for administrative expenses amounting to .19% of salaries.

MINNESOTA STATE RETIREMENT SYSTEM

ACCOUNTING BALANCE SHEET AS OF DECEMBER 31, 1969

ASSETS

Cash in office	$ 129.34
Deposits in banks	184,362.68
Short term investments (at cost)	3,762,130.82
Accounts receivable:	
a) Accrued employee contributions	234,840.50
b) Accrued employer contributions	346,480.45
c) Employee back payments	17,231.82
d) Investment maturities and sales	31,850.00
e) Other	12,264.72
Accrued interest in investments	925,899.26
Dividends declared & payable, but not yet received	85,915.99
Investment in debt securities at amortized cost	64,949,782.81
Investment in equities at cost	33,544,964.90
Equipment at depreciated cost	8,020.08
Prepaid postage	2,000.00
Participation in MAFB Fund	28,644,469.48
Total Assets	$132,750,342.85

LIABILITIES AND RESERVES

LIABILITIES	
Accounts payable:	
a) Annuities	$ 2,542.66
b) Survivor Benefits	2,868.97
c) Annuitant deposits	12,885.24
d) Accrued expenses	25,344.28
e) Overpaid dividends	295.00
Suspense Item:	
a) Unredeemed 6-yr warrants (cancelled by State Auditor)	2,970.20
Total liabilities	$ 46,906.35
RESERVES	
Employee contribution reserve	$ 38,380,059.42
Retirement and disability reserve	11,563,006.20
Survivor benefit reserve	367,185.00
Reserve for participation in MAFB Fund	28,644,469.48
State contribution reserve	53,748,716.40
Total reserves	$132,703,436.50
Total liabilities and reserves	$132,750,342.85

MINNESOTA STATE RETIREMENT SYSTEM

ACTUARIAL BALANCE SHEET AS OF DECEMBER 31, 1969

ASSETS

1.	Assets on Hand from Accounting Balance Sheet:		
	a) Participation in MAFB Fund	$ 28,644,469.48	
	b) All other Assets	104,105,873.37	$132,750,342.85
2.	Present Value of Employees' Future Contributions (3% of Participating Salary)		57,671,547.00
3.	Present Value of State Future Contributions Applicable to:		
	a) Entry Age Normal Cost (2.59% of Participating Salary)	$ 49,789,769.00	
	b) Unfunded Accrued Liability (Balance of 3% "Matching" Contribution less .19% for Operating Expenses or .22% of Participating Salary)	4,229,247.00	
	c) Unfunded Accrued Liability (Portion to be funded by "Additional" Contribution)	17,705,486.18	71,724,502.18
4.	TOTAL ASSETS		$262,146,392.03

LIABILITIES

5.	Current Liabilities from Accounting Balance Sheet		$ 46,906.35
6.	Present Value of Earned and Earnable Benefits Payable to Presently Active Members:		
	a) Retirement Benefits	$171,129,785.00	
	b) Disability Benefits	15,079,200.00	
	c) Refundments due to death or withdrawal	32,875,516.00	219,084,501.00
7.	Present Value of Benefits for Deferred Annuitants:		
	a) Retirement Benefits	$ 1,855,263.00	
	b) Refundments due to death or withdrawal	107,043.00	
	c) Benefits already authorized	6,129.00	1,968,435.00
8.	Present Value of Refundments to former members without vested rights		487,788.00
9.	Benefits Payable from MAFB Fund:		
	a) Funds already Transferred	$ 28,644,469.48	
	b) Transfers due MAFB Fund	11,563,006.20	40,207,475.68
10.	Present Value of Survivor Benefits		351,286.00
11.	TOTAL LIABILITIES		$262,146,392.03

The Actuarial Balance Sheet is a convenient device to present the results of an actuarial valuation. The following comments are intended to assist you in your understanding of the items contained in the Actuarial Balance Sheet.

Item 1 shows the assets on hand and was taken directly from the Accounting Balance Sheet.

Item 2 shows the present value of members' future contributions required by law equal to 3% of the members' salaries.

Item 3 shows the present value of State future contributions to the System. We have divided the present value applicable to the State's contributions as follows:

Item 3(a) The portion attributable to the State's share of the total entry age normal cost contribution of 5.59% of members' salaries. After deducting the members' share of 3%, the State's share of the entry age normal cost contribution amounts to 2.59% of members' salaries.

Item 3(b) The portion attributable to the balance of the State's "matching" 3% contribution (.41% of members' salaries less .19% which is allocated for operating expenses) which is being used to pay a portion of the State's share of the cost.

Item 3(c) The portion attributable to the State's "additional" contribution. On the basis of the annualized salaries payable as of December 31, 1969, the 1% "additional" contribution payable commencing July 1, 1970 amounts to approximately $2,468,000.00 per year and the full amount of the contribution will amortize the $17,705,486.18 shown in Item 3(c) in about 8-1/2 years. The level annual contribution required to amortize $17,705,486.18 over the 28-year period ending on December 31, 1997 is $985,038.00.

Item 5 shows the current liabilities and was taken directly from the Accounting Balance Sheet.

Item 6 shows the actuarially computed present value of all benefits earned to December 31, 1969 and earnable after that date that will be paid from the System to presently active members.

Item 7 shows the actuarially computed present value of all benefits payable from the System to members who have terminated service with vested benefits.

Item 8 shows the actuarially computed present value of refundments that will be paid from the System to members who have terminated service without vested benefits.

The total of $40,207,475.68 shown for Item 9 represents the value of benefits payable from the MAFB to MSRS retirees and may be related to a computed present value on the basis of a 3-1/2% interest assumption and the 1937 Standard Annuity Mortality Table of $40,908,047 ($39,325,956 for retirement benefits and $1,582,091 for disability benefits). We believe that the fact that the computed present value exceeds the value shown for benefits payable from the MAFB can be attributed to the fact that the later amount does not reflect investment earnings since date of transfer.

CONCLUSIONS

In a Retirement System such as yours where both the benefits and contributions are specified in the Retirement Law, the major purpose of an actuarial valuation is to determine whether or not the prescribed contributions are adequate to provide the benefits that will ultimately be paid under the System. The results of the current valuation show that the benefits to be provided under the System can be financed by the 3% members' contributions and the State's "matching" 3% contributions plus the State's "additional" contribution for approximately 8-1/2 years.

SECTION III

REQUIRED EXHIBITS

Minnesota Statutes 1967, Chapter 356, requires, in Section 356.20, Subdivision 4(1), that the actuary of the System prepare an exhibit setting forth certain specified information with regard to the System as of the valuation date, including "Reserves Required" under the System. In an earlier conference with representatives of the State's Employee Retirement System's Interim Commission, we were advised that "Reserve Required", as contemplated in the aforementioned statute, may be defined as the actuarially computed present value applicable to a specified benefit reduced by the actuarially computed present value of any portion of the total entry age normal cost contribution under the System which is applicable to the specified benefit.

The exhibit required by Section 356.20, Subdivision 4(1) of Minnesota Statutes 1967, Chapter 356, is presented on the following pages of this Section III and we hereby certify that the Reserves Required set forth therein have been computed in accordance with the Entry Age Normal Cost (level Normal Cost) basis in the manner outlined in the definition referred to above.

MINNESOTA STATE RETIREMENT SYSTEM

EXHIBIT REQUIRED BY MINNESOTA STATUTES 1967, CHAPTER 356,
SECTION 356.20, SUBDIVISION 4(1)
AS OF
DECEMBER 31, 1969

ASSETS AND UNFUNDED ACCRUED LIABILITY

Assets		
1.	Cash in office	$ 129.34
2.	Deposits in banks	184,362.68
3.	Short term investments (at cost)	3,762,130.82
4.	Accounts receivable:	
	a) Accrued employee contributions	234,840.50
	b) Accrued employer contributions	346,480.45
	c) Employee back payments	17,231.82
	d) Investment maturities and sales	31,850.00
	e) Other	12,264.72
5.	Accrued interest in investments	925,899.26
6.	Dividends declared & payable, but not yet received	85,915.99
7.	Investment in debt securities at amortized cost	64,949,782.81
8.	Investment in equities at cost (Market Value $34,494,194.00)	33,544,964.00
9.	Equipment at depreciated cost	8,020.08
10.	Prepaid postage	2,000.00
11.	Participation in MAFB Fund	28,644,469.48
12.	TOTAL ASSETS	$132,750,342.85
Unfunded Accrued Liability		
13.	Unfunded Accrued Liability to be funded by portion of State's 3% "Matching Contribution" in excess of State's share of entry age normal cost contribution and Operating Expenses	$ 4,229,247.00
14.	Unfunded Accrued Liability to be funded by State's "Additional" contribution	17,705,486.18
15.	Total Unfunded Accrued Liability	$ 21,934,733.18
16.	TOTAL ASSETS AND UNFUNDED ACCRUED LIABILITY	$154,685,076.03

CURRENT LIABILITIES AND RESERVES REQUIRED

Current Liabilities		
17.	Accounts Payable:	
	a) Annuities	$ 2,542.66
	b) Survivor Benefits	2,868.97
	c) Annuitant deposits	12,885.24
	d) Accrued expenses	25,344.28
	e) Overpaid dividends	295.00
18.	Suspense Item	2,970.20
19.	Total current liabilities	$ 46,906.35
Reserves Required		
20.	Total Reserves Required per attached schedule	$154,638,169.68
21.	TOTAL CURRENT LIABILITIES AND RESERVES REQUIRED	$154,685,076.03

Note: Accumulated contributions, without interest, of members not yet retired amounted to $38,380,059.42 as of December 31, 1969.

MINNESOTA STATE RETIREMENT SYSTEM

DETERMINATION OF RESERVES REQUIRED AS OF DECEMBER 31, 1969

Benefits For:	(1) Present Value of Benefits	(2) Present Value of Applicable Portion of Normal Cost Contribution	(3) Reserves Required (1) - (2)
1. Active Members:			
a) Retirement Benefits	$171,129,785.00	$ 70,359,287.00	$100,770,498.00
b) Disability Benefits	15,079,200.00	9,611,925.00	5,467,275.00
c) Refundments due to death or withdrawal	32,875,516.00	27,490,104.00	5,385,412.00
2. Deferred Annuitants	1,968,435.00	-	1,968,435.00
3. Former Members Without Vested Rights	487,788.00	-	487,788.00
4. Survivors	351,286.00	-	351,286.00
5. Benefits Payable from MAFB Fund:			
a) Funds already transferred	28,644,469.48	-	28,644,469.48
b) Transfers due MAFB Fund	11,563,006.20	-	11,563,006.20
6. Total	$262,099,485.68	$107,461,316.00	$154,638,169.68

Minnesota Statutes 1967, Chapter 356, requires, in Section 356.20, Subdivision 4(2) and (3), that there be submitted annually an analysis of the System's income and deductions from income with increases in total reserves required being specificially referred to as a deduction from income. The exhibit required by Section 356.20, Subdivision 4(2) and (3) is presented on the following page of this Section III. Items of income and deductions from income with the exception of increases in total reserves required were taken directly from statements prepared by the Executive Director.

Inasmuch as any excess of "income" over "deductions from income" must be equal to the reduction in the Unfunded Accrued Liability of the System over the period covered by the analysis, we have confirmed that fact in Item 13 of the exhibit. It should be borne in mind that the December 31, 1968 amounts are based on a 3% interest assumption.

MINNESOTA STATE RETIREMENT SYSTEM

EXHIBIT REQUIRED BY MINNESOTA STATUTES 1967, CHAPTER 356, SECTION 356.20, SUBDIVISION 4(2) and (3)
FISCAL YEAR ENDING DECEMBER 31, 1969

ANALYSIS OF INCOME AND DEDUCTIONS FROM INCOME

INCOME		
1. From Employees		
Employee contributions		$ 6,180,397.77
Employee accrued contributions receivable		234,840.50
Employee contributions applied to past due payments		7,103.71
2. From Employers		
Employer contributions		6,187,554.16
Employer additional contributions		3,581,831.68
Employer accrued contributions receivable		346,480.45
3. From Investments		
Interest on debt securities (net)		3,692,714.58
Dividends on corporate stock		1,292,884.31
Premium on bonds called		5,212.31
4. Other Revenues		
Interest on back payments by employees		10,927.62
Employer payments in lieu of interest		559.91
Adjustment in prior year benefit payments		2,480.31
Unclaimed benefits cancelled into fund		357.02
Gain on sales/transfers of securities		233,030.89
5. TOTAL INCOME		$21,776,375.22
DEDUCTIONS FROM INCOME		
6. Benefits		
Retirement benefits (paid from MSRS Fund)		$ 2,126,230.92
Retirement benefits (paid from MAFB Fund)		2,301,867.35
Survivor benefits		32,867.64
Interest paid - deaths & compulsory retirees		65,792.01
7. Refundments		
Left service		1,680,270.57
Coverage by other systems		130,096.10
Employee deaths		254,899.06
Annuitant deaths (paid from MSRS Fund)		22,583.33
Annuitant deaths (paid from MAFB Fund)		27,554.77
Erroneous deductions		8,592.76
8. Operating Expenses		365,713.40
9. Miscellaneous		
Interest transferred to TRA Fund		1,186.76
10. Increase in Total Reserves Required		
Reserves Required 12-31-68	$140,224,410.00	
Reserves Required 12-31-69	154,638,169.68	14,413,759.68
11. TOTAL DEDUCTIONS FROM INCOME		$21,431,414.35
12. EXCESS OF INCOME OVER DEDUCTIONS FROM INCOME		$ 344,960.87
13. REDUCTION IN UNFUNDED ACCRUED LIABILITY:		
Unfunded Accrued Liability 12-31-68	$ 22,279,694.05	
Unfunded Accrued Liability 12-31-69	21,934,733.18	$ 344,960.87

Minnesota Statutes 1967, Chapter 356, requires, in Section 356.20, Subdivision 4(4), that there be submitted annually an analysis of changes in the membership of the System. Section 356.21, Subdivisions 4 and 5, requires information with respect to the annual payroll and annual annuities of the members of the System as well as certain information with respect to average ages. The exhibit required by Section 356.20, Subdivision 4(4), Section 356.21, Subdivision 4(6), and Section 356.21, Subdivision 5(9) and (10) is presented on the following pages of this Section III. All of the information was taken directly from an exhibit prepared by the Executive Director.

MINNESOTA STATE RETIREMENT SYSTEM

EXHIBIT REQUIRED BY MINNESOTA STATUTES 1967, CHAPTER 356, SECTION 356.20, SUBDIVISION 4(4), SECTION 356.21, SUBDIVISION 4(6) AND SECTION 356.21, SUBDIVISION 5(9) AND (10)
FISCAL YEAR ENDING DECEMBER 31, 1969

COVERED EMPLOYEE STATEMENT

ACTIVE EMPLOYEES:

	NUMBER	ANNUAL PAYROLL
Active at January 1, 1969	34,591	$181,058,513.95
New Entrants, 1969:	10,248	17,397,684.83
TOTAL:	44,839	
Less Separations from Active Service:		
Refundment:	6,037	$ 9,680,197.59
*Separation with a Vested Right to a deferred annuity:	76	
*Separation with neither refundment nor right to a deferred annuity:	1,829	
Disability	25	33,611.89
Death	119	377,564.43
Service Retirement	347	1,544,397.15
TOTAL SEPARATIONS:	8,433	
Active at December 31, 1969	36,406	$201,375,594.94

*Employees in this group do not have earning or deductions in 1969.

Average Entry Age of New Employees

For the Year	Male	Female	Average of Total
1965	31.4	26.1	28.4
1966	31.4	26.1	28.2
1967	32.0	28.1	29.5
1968	31.5	27.4	28.9
1969	31.1	26.8	28.2

Average age at entry into State service for all active employees at December 31, 1969:

Average Male	33.4
Average Female	31.6
Total Average	32.0

ANNUITANT STATEMENT

	Number	Annual Annuity Benefit Payable
(1) SERVICE RETIREMENT ANNUITANTS:		
Receiving at January 1, 1969	3,303	$3,704,534.52
New	348	464,210.88
3.56% increase - Laws 1969, Ch.893,Sec.8		115,728.96
TOTAL:	3,651	$4,284,474.36
Reductions:		
Deaths	182	$ 213,916.92
TOTAL:	182	$ 213,916.92
Receiving at December 31, 1969	3,469	$4,070,557.44
(2) DISABLED EMPLOYEES:		
Receiving at January 1, 1969	167	$ 133,360.92
New Disabilities	25	23,931.24
3.56% increase - Laws 1969, Ch.893, Sec.8		4,537.84
TOTAL:	192	$ 161,830.00
Reductions:		
Deaths	18	$ 13,945.20
TOTAL:	18	$ 13,945.20
Receiving at December 31, 1969	174	$ 147,884.80

(3) WIDOWS RECEIVING AN ANNUITY OR SURVIVOR BENEFIT:

A. Beneficiaries of Retired Employees Receiving an optional or reversionary annuity:

	Number	Annual Annuity Benefit Payable
Receiving at January 1, 1969	118	$ 90,367.44
New	11	7,592.04
3.56% increase - Laws 1969, Ch.893,Sec.8		3,167.64
TOTAL:	129	$ 101,127.12
Reductions:		
Deaths	7	$ 3,921.12
TOTAL:	7	$ 3,921.12
Receiving at December 31, 1969	122	$ 97,206.00

ANNUITANT STATEMENT (Continued)

	Number	Annual Survivor Benefit Payable
B. Spouses Receiving a Survivor Benefit:		
Receiving at January 1, 1969	36	$ 32,087.64
New	0	
TOTAL:	36	$ 32,087.64
Reductions:		
Widow Death	1	$ 780.00
TOTAL:	1	$ 780.00
Receiving at December 31, 1969	35	$ 31,307.64

(4) CHILDREN RECEIVING A SURVIVOR BENEFIT:

Receiving at January 1, 1969	1	$ 780.00
Receiving at December 31, 1969	1	$ 780.00

(5) DEFERRED ANNUITANTS (Left State service before reaching retirement age):

	Number	Annual Survivor Benefit Payable
Receiving at January 1, 1969	475	$299,083.92
New Retirements	46	$ 27,796.80
3.56% increase - Laws 1969, Ch.893, Sec.8		10,375.80
TOTAL:	521	$337,256.52
Reductions:		
Deaths	18	$ 10,377.84
TOTAL:	18	$ 10,377.84
Receiving at December 31, 1969	503	$326,878.68

Average Age at Retirement of New Service Annuitants

Year	Average Retirement Age
1965	66 years 4 months
1966	66 years 2 months
1967	66 years
1968	67 years 4 months
1969	66 years 2 months

Average age at retirement of all existing annuitants: 66 years 4 months

Section 356.21, Subdivision 4 of the Minnesota Statutes 1967 requires an analysis of the increase or decrease in the unfunded liability that occurred since the last valuation. The exhibit shown on the following pages of this Section III contains the information required by Section 356.21, Subdivision 4(1), (2), (3), (4) and (5).

MINNESOTA STATE RETIREMENT SYSTEM

EXHIBIT REQUIRED BY MINNESOTA STATUTES 1967, CHAPTER 356
SECTION 356.21, SUBDIVISION 4(1), (2), (3), (4) and (5)
FISCAL YEAR ENDING DECEMBER 31, 1969

1.	Unfunded Accrued Liability December 31, 1968				$22,279,694
2.	Change due to current rate of funding and interest requirement (Subdivision 4(4)):				
	(a) 1969 Past Service Contribution	-	$4,387,696		
	(b) 3% interest requirement	+	668,391	-	3,719,305
3.	Change due to actuarial gains (-) or losses (+) because of 1969 experience deviations from expected (Subdivision 4(3))				
	(a) Excess interest earnings	-	1,872,686		
	(b) Withdrawals	-	272,668		
	(c) Age and Service retirements	+	412,426		
	(d) Disability retirements	+	5,909		
	(e) Deaths in active service	+	74,533		
	(f) Salary increases	+	2,494,842	+	842,356
4.	Change due to 1969 entrants (Subdivision 4(5))			-	1,301,999
5.	Unfunded Accrued Liability December 31, 1969 Old Plan - 3% interest assumption (Item 1 plus Item 2 plus Item 3 plus Item 4)				18,100,746
6.	Increase due to 1969 Plan Amendments				14,133,531
7.	Unfunded Accrued Liability December 31, 1969 New Plan - 3% interest assumption				32,234,277
8.	Reduction due to Change to 3-1/2% interest assumption				10,299,544
9.	Unfunded Accrued Liability December 31, 1969 New Plan - 3-1/2% interest assumption				21,934,733

SCHEDULE 1

SALARY SCALES

Age	Male	Female
20	.580	.596
21	.597	.615
22	.614	.633
23	.634	.651
24	.654	.669
25	.674	.687
26	.694	.705
27	.714	.723
28	.734	.741
29	.754	.759
30	.774	.775
31	.793	.790
32	.810	.803
33	.826	.816
34	.840	.829
35	.851	.841
36	.863	.853
37	.874	.864
38	.883	.874
39	.892	.884
40	.901	.893
41	.909	.902
42	.917	.911
43	.924	.919
44	.931	.926
45	.938	.933
46	.942	.939
47	.948	.945
48	.956	.951
49	.960	.957
50	.965	.963
51	.970	.968
52	.974	.973
53	.978	.977
54	.981	.981

SCHEDULE I

SALARY SCALES

(Continued)

Age	Male	Female
55	.984	.984
56	.987	.987
57	.989	.988
58	.991	.990
59	.993	.991
60	.994	.993
61	.995	.994
62	.997	.996
63	.998	.997
64	.999	.999
65	1.000	1.000
66	1.000	1.000
67	1.000	1.000
68	1.000	1.000
69	1.000	1.000
70	1.000	1.000

SCHEDULE 2

Male Members

Probabilities of Separation from Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

Age	Withdrawal	Death	Disability	Age and Service Retirement
20	2,400	6		
21	2,250	6		
22	2,080	7		
23	1,920	7		
24	1,760	7		
25	1,600	8		
26	1,470	8		
27	1,340	8		
28	1,230	9		
29	1,130	9		
30	1,040	10	2	
31	950	10	2	
32	890	11	2	
33	830	12	2	
34	770	13	2	
35	720	15	2	
36	680	16	2	
37	640	18	2	
38	600	20	2	
39	560	22	2	
40	530	25	2	
41	500	28	2	
42	480	30	2	
43	460	33	2	
44	430	37	2	
45	410	41	2	
46	390	46	3	
47	370	51	4	
48	350	57	5	
49	340	63	6	

SCHEDULE 2

Male Members

(Continued)

Probabilities of Separation from Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

Age	Withdrawal	Death	Disability	Age and Service Retirement
50	320	70	7	
51	300	77	8	
52	280	85	10	
53	260	93	12	
54	240	102	14	
55	210	111	17	
56	170	120	20	
57	140	129	23	
58	90	139	28	280
59	40	148	33	30
60		157	38	100
61		166	45	100
62		175	55	140
63		184	68	180
64		194	87	870
65		204		2,200
66		214		950
67		224		1,250
68		234		1,700
69		244		2,150
70				10,000

SCHEDULE 3

Female Members

Probabilities of Separation from Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

Age	Withdrawal	Death	Disability	Age and Service Retirement
20	3,700	5		
21	3,550	6		
22	3,390	6		
23	3,230	6		
24	3,070	6		
25	2,910	6		
26	2,750	6		
27	2,600	6		
28	2,430	6		
29	2,270	6		
30	2,120	6		
31	1,970	7		
32	1,820	7		
33	1,680	7		
34	1,540	7		
35	1,410	8	1	
36	1,300	8	1	
37	1,190	8	1	
38	1,090	8	1	
39	1,000	9	2	
40	920	9	2	
41	850	10	2	
42	780	11	3	
43	720	12	3	
44	680	13	3	
45	630	14	3	
46	590	15	4	
47	560	16	4	
48	530	17	4	
49	500	18	5	

SCHEDULE 3

Female Members

(Continued)

Probabilities of Separation from Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

Age	Withdrawal	Death	Disability	Age and Service Retirement
50	470	19	5	
51	440	20	6	
52	410	22	7	
53	390	24	8	
54	360	26	10	
55	330	32	12	
56	290	39	15	
57	230	45	18	
58	170	53	22	200
59	90	61	26	50
60		80	31	100
61		83	37	50
62		86	44	150
63		96	52	200
64		105	61	600
65		114		2,150
66		124		1,200
67		133		1,400
68		144		2,500
69		154		3,550
70				10,000

GVS Minnesota Memorandum No. 70-1
July 17, 1970

MSRS VALUATION AS OF DECEMBER 31, 1969

The purpose of this memorandum is to discuss the valuation report of the Minnesota State Retirement System dated June 5, 1970 which was submitted to the Commission in accordance with Chapter 249 of Minnesota Laws 1967. The valuation was made using the entry age normal cost method and assuming 3 1/2% interest. All valuation reports mentioned in this memorandum were prepared by Coates, Herfurth and England, Consulting Actuaries.

This memo contains the following:

1. Statistical and Valuation Data
2. Discussion of Valuation Results
3. Conclusion

1. Statistical and Valuation Data

Results of the valuation reports as of December 31, 1968 and December 31, 1969 are shown for comparative purposes. Figures are rounded where necessary for simplicity of presentation.

	As of December 31, 1968	As of December 31, 1969
(1) Membership		
Active Members	34,591	36,406
Inactive Members	7,264	7,905
Retired Members	3,899	4,094
Disabled Members	167	174
Survivors of Deceased Members	37	36
(2) Payroll and Annuities Payable		
Total Annualized Payroll	$ 214.2 Million	$ 246.8 Million
Annuities (annual)	4.3 Million	4.7 Million
(3) Valuation Balance Sheet		
Accrued Liability	$ 140.2 Million	$ 154.6 Million
Assets	117.9 Million	132.7 Million
Unfunded Accrued Liability (Deficit)	$22.3 Million	$ 21.9 Million
Funding Ratio (Ratio of Assets to Accrued Liability)	84.1%	85.8%

	As of December 31, 1968	As of December 31, 1969
(4) Normal Cost and Funding Costs	Percent of Covered Payroll	Percent of Covered Payroll
Normal Cost	5.44%	5.59%
Normal Cost	5.44%	5.59%
Interest on Deficit	0.31	0.31
Expenses	0.19	0.19
Total ("Minimum Contribution")	5.94%	6.09%
Normal Cost	5.44%	5.59%
Amortization by 1997	0.53	0.49
Expenses	0.19	0.19
Total ("Required Contribution")	6.16%	6.27%
(5) Statutory Contributions		
Employee	3.0%	3.0%
Employer Regular	3.0	3.0
Employer Additional	2.0	1.5 - 1.0
Total Contributions	8.0%	7.5 - 7.0% *

* 1.5% to June 30, 1970 and 1.0% thereafter.

(6) Investment Yield (A)	4.36%	4.59% *

(A) Ratio of investment income (on an accrual basis) to mean assets.

* Excluding assets in Minnesota Adjustable Fixed Benefit Fund as of December 31, 1969.

2. Discussion of Valuation Results

Since the 1968 valuation was based upon a 3% interest assumption and the 1969 valuation on a 3 1/2% assumption, the above summaries do not provide a comparable basis for a review. Therefore, we shall first summarize the 1969 figures on a 3% assumption.

Accrued Liability	$164.9	Normal Cost	6.10%
Assets	132.7	Amortization by 1997	0.68
Unfunded Accrued Liability	$ 32.2	Expenses	0.19
			6.97%
Funding Ratio	80.5%		

The analysis is complicated further by the fact that the 1969 Legislature made improvements in the benefits provided by the MSRS. If these improvements had not been made, the above summary on a 3% basis would have appeared as follows:

Accrued Liability	$150.8	Normal Cost	5.44%
Assets	132.7	Amortization by 1997	0.38
Unfunded Accrued Liability	$ 18.1	Expenses	0.19
			6.01%
Funding Ratio	88.0%		

The following chart displays the effect of the changes in one place:

	Unfunded Accrued Liability	Normal Cost	Total Required Support
1968 - Old Benefits - 3.0%	$ 22.3 Million	5.44%	6.16%
1969 - Old Benefits - 3.0%	18.1 Million	5.44	6.01
1969 - New Benefits - 3.0%	32.2 Million	6.10	6.97
1969 - New Benefits - 3.5%	21.9 Million	5.59	6.27

The MSRS Actuary gives the following breakdown of the change in the unfunded accrued liability from the 1968 figure of $22.3 million to the 1969 figure of $21.9 million:

Decreases:		
Amortization Contribution	$ 3,719,305	
Excess Interest Earnings	1,872,686	
Excess Terminations	272,668	
1969 New Entrants	1,301,999	
Change in Interest Assumption	10,299,544	
		$ 17,466,202
Increases:		
Deviations in Retirement Rates	$ 412,426	
Deviations in Death Rates	74,533	
Deviations in Disability Rates	5,909	
Deviations in Salary Increases	2,494,842	
Improvement in Benefits	14,133,531	
		17,121,241
Net Decrease		$ 344,961

The amortization contribution is about $700,000 less than the corresponding figure last year. This was caused by a reduction in the Employer Additional Contribution from 2% of payroll to 1 1/2% as of July 1, 1969.

The excess interest earnings are up about $175,000 on account of a higher rate of return. The increase was held down by the transfer of assets to the Adjustable Fixed Benefit Fund; after transfer, MSRS does not benefit from excess earnings on these assets. Next year the effect of the transfer will be felt for an entire year rather than for six months. Furthermore, the excess will be measured from 3.5% rather than from 3%. Therefore, unless there is a steep increase in the rate of return, we can expect the gain from excess interest earnings to be smaller next year.

The Report shows that the average age for new entrants during 1969 was slightly lower than the average ages during other recent years. This indicates a younger age distribution for the 1969 new entrants than for the group on which the 5.44% normal cost was based. Therefore, the present value of future normal costs for the 1969 new entrants exceeds the present value of their benefits which produces the $1,301,999 decrease in the unfunded accrued liability shown in the summary.

The above summary indicates that terminations occurred at a higher rate than assumed. This gain is about $180,000 larger than the corresponding gain during 1968.

Among the actuarial losses, the loss from deviations in retirement rates is about $365,000 larger than the loss in 1968 and the loss from deviations in salary increases has increased about $1,950,000. A continuation of this pattern may suggest a change in these assumptions the next time a survey is made.

3. Conclusion

The 1969 Valuation Report filed by MSRS conforms with the requirements of Chapter 249. Furthermore, this is an excellent Report containing much useful information and much pertinent discussion.

On page 10 of the Report, the MSRS Actuary concludes: "The results of the current valuation show that the benefits to be provided under the System can be financed by the 3% members' contributions and the State's "matching" 3% contributions plus the State's "additional" contribution for approximately 8 1/2 years." In our opinion, this conclusion is correct.

Franklin C. Smith
Associate, Society of Actuaries
GEORGE V. STENNES AND ASSOCIATES
Commission Actuaries

REPORT ON

ACTUARIAL VALUATION

MINNESOTA STATE RETIREMENT SYSTEM

DECEMBER 31, 1969

3% INTEREST RATE ASSUMPTION

June 5, 1970

COATES, HERFURTH & ENGLAND
CONSULTING ACTUARIES
301 EAST COLORADO BLVD.
PASADENA, CALIFORNIA 91101

OFFICES IN
SAN FRANCISCO
DENVER
PASADENA

TELEPHONE
AREA CODE 213 681-4455

June 5, 1970

Board of Trustees
Minnesota State Retirement System
530 North Robert Street
St. Paul, Minnesota 55101

Gentlemen:

We are pleased to transmit herewith our report on the actuarial valuation of your Retirement System made as of December 31, 1969 on the basis of a 3% interest rate assumption. This valuation was authorized under Contract No. E-5206.

We look forward to the opportunity of discussing this report with you at your convenience.

Very truly yours,

COATES, HERFURTH & ENGLAND
Consulting Actuaries

By ____________________
Robert H. Little, F.S.A.

RHL:th

REPORT ON
ACTUARIAL VALUATION
OF THE
MINNESOTA STATE RETIREMENT SYSTEM
AS OF
DECEMBER 31, 1969

ON THE BASIS OF 3% INTEREST RATE ASSUMPTION

The contract under which this valuation was authorized specified that the actuarial valuation be carried out on the basis of the System as it was constituted on December 31, 1969 using 3% and 3-1/2% interest rate assumptions and the other actuarial assumptions developed during the course of the December 31, 1967 actuarial investigation. This report sets forth the results of the 3% valuation. The results of the 3-1/2% valuation have been submitted in a separate report.

In order to develop the entry age normal cost contribution rate for new employees, we carried out a complete valuation as of December 31, 1969 of active members who were employed during the preceding five-year period. The results of these calculations indicate that the total entry age normal cost rate amounts to 6.10% of salary. This rate compares with a 5.59% rate developed on the basis of a 3-1/2% interest assumption.

Employees are required by law to contribute 3% and, accordingly, the State's share of the entry age normal cost contribution rate amounts to 3.10%.

The law requires that the State make the following contributions to the Fund with respect to members contributing at a 3% rate:

(1) A "matching" contribution equal to 3% of the members' participating salaries, and

(2) An "additional" contribution equal to one-third of members' contributions, or 1% of participating salaries, commencing July 1, 1970.

We have been advised that it is the intent of the Minnesota Legislature to pay the "additional" contributions referred to above for a limited time only. Accordingly, we have assumed that the State's "matching" contribution would be increased to 3.29% to cover the State's share of the entry age normal contribution (3.10%) plus .19% for expenses.

The Actuarial Balance Sheet shown on the following page summarizes the results of the valuation. An Accounting Balance Sheet has not been included in this report because it would duplicate the Accounting Balance Sheet included in our report on the 3-1/2% valuation required by law.

MINNESOTA STATE RETIREMENT SYSTEM

ACTUARIAL BALANCE SHEET AS OF DECEMBER 31, 1969

3% INTEREST RATE ASSUMPTION

ASSETS

1.	Assets on Hand from Accounting Balance Sheet:		
	a) Participation in MAFB Fund	$ 28,644,469.48	
	b) All other Assets	104,105,873.37	$132,750,342.85
2.	Present Value of Employees' Future Contributions (3% of Participating Salary)		59,922,324.00
3.	Present Value of State Future Contributions Applicable to:		
	a) Entry Age Normal Cost (3.10% of Participating Salary)	$ 61,919,735.00	
	b) Unfunded Accrued Liability (Balance of "Matching" Contribution)	-0-	
	c) Unfunded Accrued Liability (Portion to be funded by "Additional" Contribution)	32,234,277.18	94,154,012.18
4.	TOTAL ASSETS		$286,826,679.03

LIABILITIES

5.	Current Liabilities from Accounting Balance Sheet		$ 46,906.35
6.	Present Value of Earned and Earnable Benefits Payable to Presently Active Members:		
	a) Retirement Benefits	$193,102,138.00	
	b) Disability Benefits	16,514,550.00	
	c) Refundments due to death or withdrawal	33,989,960.00	243,606,648.00
7.	Present Value of Benefits for Deferred Annuitants:		
	a) Retirement Benefits	$ 1,997,916.00	
	b) Refundments due to death or withdrawal	107,043.00	
	c) Benefits already authorized	6,445.00	2,111,404.00
8.	Present Value of Refundments to former members without vested rights		487,788.00
9.	Benefits Payable from MAFB Fund:		
	a) Funds already Transferred	$ 28,644,469.48	
	b) Transfers due MAFB Fund	11,563,006.20	40,207,475.68
10.	Present Value of Survivor Benefits		366,457.00
11.	TOTAL LIABILITIES		$286,826,679.03

The Actuarial Balance Sheet is a convenient device to present the results of an actuarial valuation. The following comments are intended to assist you in your understanding of the items contained in the Actuarial Balance Sheet.

Item 1 shows the assets on hand and was taken directly from the Accounting Balance Sheet.

Item 2 shows the present value of members' future contributions required by law equal to 3% of the members' participating salaries.

Item 3 shows the present value of State future contributions to the System. We have divided the present value applicable to the State's contributions as follows:

Item 3(a) The portion attributable to the State's share of the total entry age normal cost contribution of 6.10% of members' salaries. After deducting the members' share of 3%, the State's share of the entry age normal cost contribution amounts to 3.10% of members' salaries.

Item 3(b) The portion attributable to the balance of the State's "matching" contribution which is assumed to be zero because the total entry age normal cost exceeds 6%.

Item 3(c) The portion attributable to the State's "additional" contribution.

Item 5 shows the current liabilities and was taken directly from the Accounting Balance Sheet.

Item 6 shows the actuarially computed present value of all benefits earned to December 31, 1969 and earnable after that date that will be paid from the System to presently active members.

Item 7 shows the actuarially computed present value of all benefits payable from the System to members who have terminated service with vested benefits.

Item 8 shows the actuarially computed present value of refundments that will be paid from the System to members who have terminated service without vested benefits.

Item 9 shows the MSRS participation in the MAFB Fund and Item 10 shows the present value of survivor benefits.

The three exhibits presented on the following pages of this report are those which conform to the requirements of Minnesota Statutes 1967, Chapter 356, Section 356.20, Subdivisions 4(1), 4(2) and 4(3), except for the fact that they reflect a 3% interest assumption rather than the 3-1/2% assumption required by Chapter 356.

MINNESOTA STATE RETIREMENT SYSTEM

EXHIBIT REQUIRED BY MINNESOTA STATUTES 1967, CHAPTER 356, SECTION 356.20, SUBDIVISION 4(1) AS OF DECEMBER 31, 1969

3% INTEREST RATE ASSUMPTION

ASSETS AND UNFUNDED ACCRUED LIABILITY

Assets		
1.	Cash in office	$ 129.34
2.	Deposits in banks	184,362.68
3.	Short term investments (at cost)	3,762,130.82
4.	Accounts receivable:	
	a) Accrued employee contributions	234,840.50
	b) Accrued employer contributions	346,480.45
	c) Employee back payments	17,231.82
	d) Investment maturities and sales	31,850.00
	e) Other	12,264.72
5.	Accrued interest in investments	925,899.26
6.	Dividends declared & payable, but not yet received	85,915.99
7.	Investment in debt securities at amortized cost	64,949,782.81
8.	Investment in equities at cost (Market Value $34,494,194.00)	33,544,964.00
9.	Equipment at depreciated cost	8,020.08
10.	Prepaid postage	2,000.00
11.	Participation in MAFB Fund	28,644,469.48
12.	TOTAL ASSETS	$132,750,342.85
Unfunded Accrued Liability		
13.	Unfunded Accrued Liability to be funded by portion of State's 3% "Matching Contribution" in excess of State's share of entry age normal cost contribution and Operating Expenses	$ -0-
14.	Unfunded Accrued Liability to be funded by State's "Additional" contribution	32,234,277.18
15.	Total Unfunded Accrued Liability	$ 32,234,277.18
16.	TOTAL ASSETS AND UNFUNDED ACCRUED LIABILITY	$164,984,620.03

CURRENT LIABILITIES AND RESERVES REQUIRED

Current Liabilities		
17.	Accounts Payable:	
	a) Annuities	$ 2,542.66
	b) Survivor Benefits	2,868.97
	c) Annuitant deposits	12,885.24
	d) Accrued expenses	25,344.28
	e) Overpaid dividends	295.00
18.	Suspense Item	2,970.20
19.	Total current liabilities	$ 46,906.35
Reserves Required		
20.	Total Reserves Required per attached schedule	$164,937,713.68
21.	TOTAL CURRENT LIABILITIES AND RESERVES REQUIRED	$164,984,620.03

Note: Accumulated contributions, without interest, of members not yet retired amounted to $38,380,059.42 as of December 31, 1969.

MINNESOTA STATE RETIREMENT SYSTEM

DETERMINATION OF RESERVES REQUIRED
AS OF
DECEMBER 31, 1969

3% INTEREST RATE ASSUMPTION

Benefits For:	(1) Present Value of Benefits	(2) Present Value of Applicable Portion of Normal Cost Contribution	(3) Reserves Required (1) - (2)
1. Active Members:			
a) Retirement Benefits	$193,102,138.00	$ 82,493,066.00	$110,609,072.00
b) Disability Benefits	16,514,550.00	10,586,277.00	5,928,273.00
c) Refundments due to death or withdrawal	33,989,960.00	28,762,716.00	5,227,244.00
2. Deferred Annuitants	2,111,404.00	-	2,111,404.00
3. Former Members Without Vested Rights	487,788.00	-	487,788.00
4. Survivors	366,457.00	-	366,457.00
5. Benefits Payable from MAFB Fund:			
a) Funds already transferred	28,644,469.48	-	28,644,469.48
b) Transfers due MAFB Fund	11,563,006.20	-	11,563,006.20
6. Total	$286,779,772.68	$121,842,059.00	$164,937,713.68

MINNESOTA STATE RETIREMENT SYSTEM

EXHIBIT REQUIRED BY MINNESOTA STATUTES 1967, CHAPTER 356, SECTION 356.20, SUBDIVISION 4(2) and (3) FISCAL YEAR ENDING DECEMBER 31, 1969

3% INTEREST RATE ASSUMPTION

ANALYSIS OF INCOME AND DEDUCTIONS FROM INCOME

INCOME			
1.	From Employees		
	Employee contributions		$ 6,180,397.77
	Employee accrued contributions receivable		234,840.50
	Employee contributions applied to past due payments		7,103.71
2.	From Employers		
	Employer contributions		6,187,554.16
	Employer additional contributions		3,581,831.68
	Employer accrued contributions receivable		346,480.45
3.	From Investments		
	Interest on debt securities (net)		3,692,714.58
	Dividends on corporate stock		1,292,884.31
	Premium on bonds called		5,212.31
4.	Other Revenues		
	Interest on back payments by employees		10,927.62
	Employer payments in lieu of interest		559.91
	Adjustment in prior year benefit payments		2,480.31
	Unclaimed benefits cancelled into fund		357.02
	Gain on sales/transfers of securities		233,030.89
5.	TOTAL INCOME		$21,776,375.22
DEDUCTIONS FROM INCOME			
6.	Benefits		
	Retirement benefits (paid from MSRS Fund)		$ 2,126,230.92
	Retirement benefits (paid from MAFB Fund)		2,301,867.35
	Survivor benefits		32,867.64
	Interest paid - deaths & compulsory retirees		65,792.01
7.	Refundments		
	Left service		1,680,270.57
	Coverage by other systems		130,096.10
	Employee deaths		254,899.06
	Annuitant deaths (paid from MSRS Fund)		22,583.33
	Annuitant deaths (paid from MAFB Fund)		27,554.77
	Erroneous deductions		8,592.76
8.	Operating Expenses		365,713.40
9.	Miscellaneous		
	Interest transferred to TRA Fund		1,186.76
10.	Increase in Total Reserves Required		
	Reserves Required 12-31-68	$140,224,410.00	
	Reserves Required 12-31-69	164,937,713.68	24,713,303.68
11.	TOTAL DEDUCTIONS FROM INCOME		$31,730,958.35
12.	EXCESS OF INCOME OVER DEDUCTIONS FROM INCOME		($ 9,954,583.13)
13.	REDUCTION IN UNFUNDED ACCRUED LIABILITY:		
	Unfunded Accrued Liability 12-31-68	$ 22,279,694.05	
	Unfunded Accrued Liability 12-31-69	32,234,277.18	($ 9,954,583.13)