REPORT ON

ACTUARIAL VALUATION

MINNESOTA STATE RETIREMENT SYSTEM

DECEMBER 31, 1968

June 20, 1969

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 20, 1969

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, 1968.

Pursuant to Contract No. E-2796, under which this valuation was authorized, the actuarial valuation was carried out on the basis of a 3% 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.

We hereby certify that the actuarial valuation of the Minnesota State Retirement System made as of December 31, 1968 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, 1968

SECTION I

INTRODUCTION

In accordance with Contract No. E-2796 between the State of Minnesota and this firm, we have completed the actuarial valuation of the Minnesota State Retirement System as of December 31, 1968.

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, 1968. 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, 1968.

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, 1968 and does not reflect any amendments to the System that may become effective subsequent to that date.

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% 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, 1967 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 5.44% of salary. Employees are required by law to contribute 3% and, accordingly, the State's share of the entry age normal cost contribution rate amounts to 2.44%. 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' participating salaries, and

(2) An "additional" contribution equal to two-thirds of members' contributions, or 2% of participating salary.

In the case of members contributing at a 6% rate, the required contributions by the State are:

(1) A "matching" contribution equal to 6% of the members' participating salaries, and

(2) An "additional" contribution equal to one-sixth of members' contributions, or 1% of participating salary.

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. Inasmuch as there were only 28 active employees who were contributing at the 6% level as of December 31, 1968, we will hereinafter refer only to the State's contribution totaling 5% of salary which applies to members contributing at the 3% rate.

The Accounting Balance Sheet shown on the following page was furnished by the Executive Director. The Reserves for benefits already granted in the amount of $38,714,939 reflect the balances shown on the System records before making the adjustments which will result from the current valuation.

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 providion for administrative expenses amounting to .19% of salaries.

MINNESOTA STATE RETIREMENT SYSTEM

ACCOUNTING BALANCE SHEET
AS OF
DECEMBER 31, 1968

ASSETS

Cash in office	$ 25.00
Deposits in banks	64,207.80
Short term investments	3,598,248.03
Accounts receivable:	
(a) Accrued employee contributions	200,480.29
(b) Accrued employer contributions	318,879.47
(c) Past due employer contributions	-0-
(d) Employee back payments	20,034.44
(e) Investment maturities and sales	180,864.58
(f) Other	1,599.83
Accrued interest in investments	1,061,956.47
Dividends on stocks declared but not yet received	36,756.34
Investment in bonds at amortized cost	78,653,093.85
Investment in stocks at cost	35,158,642.59
Equipment at cost less depreciation	7,581.74
Prepaid postage	2,000.00
Total Assets	$119,304,370.43

LIABILITIES AND RESERVES

LIABILITIES

Accounts Payable:	
(a) Annuities	$ 3,220.82
(b) Survivor Benefits	2,868.97
(c) Annuitant deposits	9,845.49
(d) Accrued expenses	18,653.64
(e) Overpaid dividends	1,525.00
(f) Refundments due National Guard technicians	1,320,756.84
Suspense Items:	
(a) Unredeemed 6-year old warrants (cancelled by State Auditor)	2,783.72
Total current liabilities	$ 1,359,654.48

RESERVES

Employee contribution reserve	$ 35,390,037.88
Retirement and disability reserve	38,323,189.00
Survivor benefit reserve	391,750.00
State contribution reserve	43,839,739.07
Total reserves	$117,944,715.95
Total liabilities and reserves	$119,304,370.43

MINNESOTA STATE RETIREMENT SYSTEM

ACTUARIAL BALANCE SHEET AS OF DECEMBER 31, 1968

ASSETS

1.	Assets on Hand from Accounting Balance Sheet		$119,304,370.43
2.	Present Value of Employees' Future Contributions (3% of Participating Salary)		52,260,705.00
3.	Present Value of State Future Contributions Applicable to:		
	(a) Entry Age Normal Cost (2.44% of Participating Salary)	$42,505,373.00	
	(b) Unfunded Accrued Liability (Balance of 3% "Matching" Contribution less .19% for Operating Expenses or .37% of Participating Salary)	6,445,487.00	
	(c) Unfunded Accrued Liability (Portion to be funded by 2% "Additional" Contribution)	15,834,207.05	64,785,067.05
4.	TOTAL ASSETS		$236,350,142.48

LIABILITIES

5.	Current Liabilities from Accounting Balance Sheet		$ 1,359,654.48
6.	Present Value of Earned and Earnable Benefits Payable to Presently Active Members:		
	(a) Retirement Benefits	$149,081,920.00	
	(b) Disability Benefits	14,552,600.00	
	(c) Refundments due to death or withdrawal	30,162,651.00	193,797,171.00
7.	Present Value of Benefits for Deferred Annuitants:		
	(a) Retirement Benefits	$ 1,800,365.00	
	(b) Refundments due to death or withdrawal	98,388.00	
	(c) Benefits already authorized	10,266.00	1,909,019.00
8.	Present Value of Refundments to former members without vested rights		459,270.00
9.	Present Value of Benefits Payable to Annuitants:		
	(a) Retirement Benefits	$ 36,945,666.00	
	(b) Disability Benefits	1,492,282.00	
	(c) Survivors' Benefits	387,080.00	38,825,028.00
10.	TOTAL LIABILITIES		$236,350,142.48

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 5.44% of members' salaries. After deducting the members' share of 3%, the State's share of the entry age normal cost contribution amounts to 2.44% of members' salaries.

Item 3(b) The portion attributable to the balance of the State's "matching" 3% contribution (.56% 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" 2% contribution. On the basis of the annualized salaries payable as of December 31, 1968, this 2% "additional" contribution amounts to approximately $4,284,000.00 per year and the full amount of the contribution will amortize the $15,834,207.05 shown in Item 3(c) in about 4 years. The level annual contribution required to amortize $15,834,207.05 over the 29-year period ending on December 31, 1997 is $813,059.00.

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, 1968 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 actuarially computed present value of all benefits payable from the System with respect to members who have retired. The System's "Retirement and Disability Reserve" and "Survivor Benefit Reserve" should be adjusted as of January 1, 1969 to $38,448,214.00 (Item 7(c) plus Items 9(a) and (b)) and $387,080.00 (Item 9(c)), respectively.

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" 2% contribution for approximately 4 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, 1968

ASSETS AND UNFUNDED ACCRUED LIABILITY

Assets			
1.	Cash in Office		$ 25.00
2.	Deposits in Banks		64,207.80
3.	Short Term Investments		3,598,248.03
4.	Accounts Receivable:		
	(a) Members' Contributions	$200,480.29	
	(b) Employer Contributions	318,879.47	
	(c) Other	202,498.85	721,858.61
5.	Accrued Interest on Investments		1,061,956.47
6.	Dividends declared but not received		36,756.34
7.	Bonds at Amortized Cost		78,653,093.85
8.	Stocks at Cost (Market Value 12/31/68 - $41,035,809.00)		35,158,642.59
9.	Equipment at Cost, less depreciation		7,581.74
10.	Other - Prepaid postage		2,000.00
11.	TOTAL ASSETS		$119,304,370.43
Unfunded Accrued Liability			
12.	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		$ 6,445,487.00
13.	Unfunded Accrued Liability to be funded by State's 2% "Additional" contribution		15,834,207.05
14.	Total Unfunded Accrued Liability		$ 22,279,694.05
15.	TOTAL ASSETS AND UNFUNDED ACCRUED LIABILITY		$141,584,064.48

CURRENT LIABILITIES AND RESERVES REQUIRED

Current Liabilities			
16.	Accounts Payable:		
	(a) Annuity Payments	$ 3,220.82	
	(b) Survivor Payments	2,868.97	
	(c) Refunds to members	9,845.49	
	(d) Accrued expenses and overpaid dividends	20,178.64	$ 36,113.92
17.	Suspense items		2,783.72
18.	Refundments due National Guard Technicians		1,320,756.84
19.	Total Current Liabilities		$ 1,359,654.48
Reserves Required			
20.	Total Reserves Required per attached schedule		140,224,410.00
21.	TOTAL CURRENT LIABILITIES AND RESERVES REQUIRED		$141,584,064.48

Note: Accumulated contributions, without interest, of members not yet retired amounted to $35,390,037.88 as of December 31, 1968.

MINNESOTA STATE RETIREMENT SYSTEM

DETERMINATION OF RESERVES REQUIRED
AS OF
DECEMBER 31, 1968

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	$149,081,920.00	$60,448,215.00	$ 88,633,705.00
(b) Disability Benefits	14,552,600.00	9,232,725.00	5,319,875.00
(c) Refundments due to death or withdrawal	30,162,651.00	25,085,138.00	5,077,513.00
2. Deferred Annuitants	1,909,019.00	-	1,909,019.00
3. Former Members Without Vested Rights	459,270.00	-	459,270.00
4. Annuitants:			
(a) Retirement Benefits	36,945,666.00	-	36,945,666.00
(b) Disability Benefits	1,492,282.00	-	1,492,282.00
(c) Survivors' Benefits	387,080.00	-	387,080.00
5. TOTAL	$234,990,488.00	$94,766,078.00	$140,224,410.00

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 14 of the exhibit.

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, 1968

ANALYSIS OF INCOME AND DEDUCTIONS FROM INCOME

INCOME

1. From Members:		
(a) Employee contributions		$ 5,804,936.45
(b) Employee accrued contributions receivable		200,480.29
(c) Employee contributions applied to past due payments		19,583.88
2. From Employers:		
(a) Employer contributions		5,757,555.89
(b) Employer additional contributions		3,746,915.73
(c) Employer accrued contributions receivable		318,879.47
(d) Employer past due contributions receivable		183,452.13
3. From Investments:		
(a) Interest on bonds and notes (net)		3,640,329.43
(b) Dividends on corporate stocks		1,145,218.94
(c) Premiums on bonds called		2,587.49
4. Other Revenues:		
(a) Interest on back payments by members		4,128.02
(b) Employer payments in lieu of interest		319.46
(c) Adjustments in prior year benefit payments		989.97
(d) Unclaimed contributions and benefits cancelled into fund		221.01
5. Net Gain on Sale of Investments		93,792.83
6. TOTAL INCOME		$20,919,390.99

DEDUCTIONS FROM INCOME

7. Benefits:		
(a) Annuities, disability and retirement allowances		$ 4,099,851.96
(b) Survivor benefits		33,526.81
(c) Interest paid on deposits of deceased employees		69,361.81
8. Refundments:		
(a) Left service		1,665,063.99
(b) Coverage by other retirement systems		1,362,147.48
(c) Employee deaths		254,949.74
(d) Annuitant deaths		50,638.23
(e) Erroneous deductions		8,263.31
9. Operating Expenses		329,320.97
10. Write-off of employer contribution receivable for National Guard Technicians		1,220,154.39
11. Increase in Total Reserves Required:		
(a) Reserves Required 12-31-67	$134,151,458.00	
(b) Reserves Required 12-31-68	140,224,410.00	6,072,952.00
12. TOTAL DEDUCTIONS FROM INCOME		$15,166,230.69
13. EXCESS OF INCOME OVER DEDUCTIONS FROM INCOME		$ 5,753,160.30
14. REDUCTION IN UNFUNDED ACCRUED LIABILITY:		
(a) Unfunded Accrued Liability 12-31-67	$ 28,032,854.35	
(b) Unfunded Accrued Liability 12-31-68	22,279,694.05	$ 5,753,160.30

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, 1968

COVERED EMPLOYEE STATEMENT

ACTIVE EMPLOYEES:		Annual Payroll	
	Number	Covered	Total
Active at January 1, 1968	34,278	$159,568,900.00	$165,053,984.40
New Entrants, 1968	9,357	16,740,741.03	16,740,741.03
Less Separations From Active, 1968:			
Refundment:	6,401	15,241,829.22	15,241,829.22
*Separation with a Vested Right to a deferred annuity:	50		
*Separation with neither Refundment nor Vested Right	1,999		
Disability	33	89,731.70	89,731.70
Death	113	280,588.68	280,588.68
Service Retirement	448	1,497,923.35	1,497,923.35
NET INCREASE	313		
Active at December 31, 1968	34,591	$181,058,513.95	$181,058,513.95

*Employees in this group do not have earning or deductions in 1968.

Average Entry Age of New Employees

For the Year	Male	Female	Average of Total
1964	31.2	27.6	29.1
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

Average age at entry into State service for all active employees at December 31, 1968:

Average Male	33.5
Average Female	31.8
Total Average	32.6

ANNUITANT STATEMENT

(1) SERVICE RETIREMENT ANNUITANTS:

	Number	Annual Annuity Benefit Payable
Receiving at January 1, 1968	3,029	$3,315,557.16
New Retirements:	436	566,688.96
TOTAL:	3,465	$3,882,246.12
Reductions:		
Deaths	162	177,711.60
Receiving at December 31, 1968	3,303	$3,704,534.52

(2) DISABLED EMPLOYEES:

	Number	Annual Disability Benefit Payable
Receiving at January 1, 1968	146	$ 110,758.56
New Disabilities	33	32,578.20
TOTAL:	179	143,336.76
Reductions:		
Deaths	12	9,975.84
Receiving at December 31, 1968	167	$ 133,360.92

(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, 1968	112	$ 84,058.56
New Beneficiaries Receiving	13	10,979.52
TOTAL:	125	$ 95,038.08
Reductions:		
End of Period Certain	5	2,141.04
Deaths	2	2,529.60
Receiving at December 31, 1968	118	$ 90,367.44

(3) WIDOWS RECEIVING AN ANNUITY OR SURVIVOR BENEFIT (Continued)

B. Spouses Receiving a Survivor Benefit

	Number	Annual Survivor Benefit Payable
Receiving at January 1, 1968	37	$ 32,867.64
Reduction:		
Widow remarried	1	780.00
Receiving at December 31, 1968	36	$ 32,087.64

(4) CHILDREN RECEIVING A SURVIVOR BENEFIT

	Number	Annual Survivor Benefit Payable
Receiving at January 1, 1968	2	$ 1,320.00
Reductions:		
Reached 18 years of age	1	540.00
Receiving at December 31, 1968	1	$ 780.00

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

	Number	Annual Annuity Benefit Payable
Receiving at January 1, 1968	443	$ 282,229.08
New Retirements	48	30,259.92
TOTAL:	491	$ 312,489.00
Reductions:		
Deaths	16	13,405.08
Receiving at December 31, 1968	475	$ 299,083.92

Average Age at Retirement of New Service Annuitants:

Year	Average Retirement Age
1964	67 yrs.
1965	66 yrs. 4 mos.
1966	66 yrs. 2 mos.
1967	66 yrs.
1968	67 yrs. 1/2 mo.

Average age at retirement of all existing service annuitants: 66 yrs. 6 mos.

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, 1968

1.	Unfunded Accrued Liability December 31, 1967		$28,032,854
2.	Change due to current rate of funding and interest requirement (Subdivision 4(4)):		
	(a) 1968 Past Service Contribution	-$5,272,450	
	(b) 3% interest requirement	+ 840,986	- 4,431,464
3.	Change due to actuarial gains (-) or losses (+) because of 1968 experience deviations from expected (Subdivision 4(3))		
	(a) Excess interest earnings	- 1,698,337	
	(b) Withdrawals	- 91,553	
	(c) Age and Service retirements	+ 46,726	
	(d) Mortality on retired lives	+ 120,355	
	(e) Disability retirements	+ 37,015	
	(f) Deaths in active service	+ 79,748	
	(g) National Guard Technician Withdrawals	+ 327,338	
	(h) Salary increases	+ 548,808	-$ 629,900
4.	Change due to 1968 entrants (Subdivision 4(5))		- 691,796
5.	Unfunded Accrued Liability December 31, 1968 (Item 1 plus Item 2 plus Item 3 plus Item 4)		$22,279,694

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 1

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. 69-1
July 18, 1969

MSRS VALUATION AS OF DECEMBER 31, 1968

The purpose of this memorandum is to discuss the valuation report of the Minnesota State Retirement System dated June 20, 1969 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% 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, 1967 and December 31, 1968 are shown for comparative purposes. Figures are rounded where necessary for simplicity of presentation.

	As of December 31, 1967	As of December 31, 1968
(1) Membership		
Active Members	34,278	34,591
Inactive Members	6,538	7,264
Retired Members	3,587	3,899
Disabled Members	146	167
Survivors of Deceased Members	39	37
(2) Payroll and Annuities Payable		
Total Annualized Payroll	\$ 207.0 Million	\$ 214.2 Million
Annuities (annual)	3.8 Million	4.3 Million
(3) Valuation Balance Sheet		
Accrued Liability	\$ 134.2 Million	\$ 140.2 Million
Assets	106.1 Million	117.9 Million
Unfunded Accrued Liability (Deficit)	\$ 28.1 Million	\$ 22.3 Million
Funding Ratio (Ratio of Assets to Accrued Liability)	79.1%	84.1%

	As of December 31, 1967	As of December 31, 1968
(4) Normal Cost and Funding Costs	Percent of Covered Payroll	Percent of Covered Payroll
Normal Cost	5.44%	5.44%
Normal Cost	5.44%	5.44%
Interest on Deficit	0.41	0.31
Expenses	0.19	0.19
Total ("Minimum Contribution")	6.04%	5.94%
Normal Cost	5.44%	5.44%
Amortization by 1997	0.67	0.53
Expenses	0.19	0.19
Total ("Required Contribution")	6.30%	6.16%
(5) Statutory Contributions		
Employee	3.0%	3.0%
Employer Regular	3.0	3.0
Employer Additional	2.0	2.0
Total Contributions	8.0%	8.0%
(6) Investment Yield (A)	4.17%	4.36%

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

2. Discussion of Valuation Results

(1) Discussion of Normal Cost

In the MSRS valuations, normal cost as a percentage of payroll is obtained from a valuation of those active members who are relatively new employees rather than from a valuation of the entire active membership. This process was carried out as of December 31, 1967 for active members who had been hired during the preceding five-year period, and the normal cost turned out to be 5.44% of salary. This percentage was not recalculated as of December 31, 1968, and 5.44% is also used as the normal cost in the current valuation. The use of this same normal cost percentage has an important effect on the unfunded accrued liability which will be pointed out later.

(2) Change in Deficit

The deficit decreased from $28.1 million on December 31, 1967 to $22.3 million on December 31, 1968, a decrease in $5.8 million. As of December 31, 1967, we estimated that the anticipated contribution toward the deficit would retire the deficit in about six to seven years. The corresponding estimate at the present time is four to five years. Thus, the retiring of the deficit is proceeding in a satisfactory manner.

A breakdown of the change in the unfunded accrued liability into the separate elements follows:

Decreases:		
Amortization Contribution	$ 4,431,464	
Excess Interest Earnings	1,698,337	
Excess Terminations	91,553	
1968 New Entrants	691,796	$ 6,913,150
Increases:		
Deviation in Retirement Rates	$ 46,726	
Deviation in Death Rates	200,103	
Deviation in Disability Rates	37,015	
Deviation in Salary Increases	548,808	
National Guard Withdrawals	327,338	1,159,990
Net Decrease		$ 5,753,160

The amortization contribution this year is about $880,000 larger than the corresponding figure last year. In 1968, the contribution was based upon full salary for the entire year compared with six months in 1967. The excess interest earnings are up about $500,000 on account of a higher rate of return on a larger volume of assets.

As mentioned earlier, the normal cost rate was not redetermined this year. Apparently the 5.44% rate exceeds the normal cost of the benefits for the 1968 new entrants. Therefore, the present value of future contributions for the 1968 new entrants at the 5.44% rate exceeds the present value of their benefits. This produces the $691,796 decrease in the unfunded accrued liability shown above.

In prior years, MSRS has carried a receivable on its balance sheet for contributions due from the Federal Government on behalf of members of the National Guard. During 1968, the National Guard members were withdrawn from MSRS, and the receivable item was written off. However, the write-off was partially offset by the actuarial reserves released, and the net result was the $327,338 loss shown above.

The other increases shown in the above list are actuarial losses which resulted from the actual experience during 1968 being less favorable than the actuarial assumptions. In the list of decreases, it is indicated that terminations occurred at a higher rate than assumed.

The MSRS Actuary also presented a valuation based upon a 3 1/2% interest assumption. For purposes of comparison, certain items from both valuations are set forth below:

	3%	3 1/2%
Accrued Liability	$ 140,224,410	$ 131,098,949
Assets	117,944,716	117,944,716
Unfunded Accrued Liability	$ 22,279,694	$ 13,154,233
Funding Ratio	84.1%	90.0%
Time to Full Funding	4-5 Years	2-3 Years
Normal Cost	5.44%	5.01%

3. Conclusion

The 1968 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" 2% contribution for approximately 4 years." In our opinion, this conclusion is correct.

It should be emphasized, however, that the 1969 Legislature improved the retirement benefit formula and made other changes which have a material effect on subsequent valuations. With the more liberal benefit formula combined with a change in the interest assumption from 3% to 3 1/2%, we can expect that the normal cost will increase above the 5.01% level shown above but will still be less than 6%. We can also expect a substantial increase in the unfunded accrued liability over the $13 million level shown above, but the present contribution rate will retire the new amount of deficit prior to the 1997 target date. It should be pointed out also that the new plan which has been created for retired employees will remove the opportunity for excess interest earnings on about $36 million of assets.

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

REPORT ON

ACTUARIAL VALUATION

MINNESOTA STATE RETIREMENT SYSTEM

DECEMBER 31, 1968

3-1/2% INTEREST RATE ASSUMPTION

June 20, 1969

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 20, 1969

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, 1968 on the basis of a 3-1/2% interest rate assumption.

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, 1968

ON THE BASIS OF 3-1/2% INTEREST RATE ASSUMPTION

The supplemental contract under which this valuation was authorized specified 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 December 31, 1967 actuarial investigation. The valuation summarized herein reflects the provisions of the System as it was constituted December 31, 1968 and does not reflect any amendments that may have occurred subsequent to that date.

In order to develop the entry age normal cost contribution rate for new employees, we carried out a complete valuation as of December 31, 1967 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 5.01% of salary. This rate compares with a 5.44% rate developed on the basis of a 3% 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 2.01%. 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' participating salaries, and

(2) An "additional" contribution equal to two-thirds of members' contributions, or 2% of participating salaries.

In the case of members contributing at a 6% rate, the required contributions by the State are:

(1) A "matching" contribution equal to 6% of the members' participating salaries, and

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

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. Inasmuch as there were only 28 active employees who were contributing at the 6% level as of December 31, 1968, we will hereinafter refer only to the State's contribution totaling 5% of salary which applies to members contributing at the 3% rate.

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% valuation required by law.

MINNESOTA STATE RETIREMENT SYSTEM

ACTUARIAL BALANCE SHEET
AS OF
DECEMBER 31, 1968

3-1/2% INTEREST RATE ASSUMPTION

ASSETS

1.	Assets on Hand from Accounting Balance Sheet		$119,304,370.43
2.	Present Value of Employees' Future Contributions (3% of Participating Salary)		50,300,082.00
3.	Present Value of State Future Contributions Applicable to:		
	(a) Entry Age Normal Cost (2.01% of Participating Salary)	$ 33,701,055.00	
	(b) Unfunded Accrued Liability (Balance of 3% "Matching" Contribution less .19% for operating expenses or .80% of Participating Salary)	13,413,355.00	
	(c) Unfunded Accrued Liability (Portion to be funded by 2% "Additional" Contribution)	(259,121.95)	46,855,288.05
4.	TOTAL ASSETS		$216,459,740.48

LIABILITIES

5.	Current Liabilities from Accounting Balance Sheet		$ 1,359,654.48
6.	Present Value of Earned and Earnable Benefits Payable to Presently Active Members:		
	(a) Retirement Benefits	$132,891,269.00	
	(b) Disability Benefits	13,289,450.00	
	(c) Refundments due to death or withdrawal	29,193,578.00	175,374,297.00
7.	Present Value of Benefits for Deferred Annuitants:		
	(a) Retirement Benefits	$ 1,671,683.00	
	(b) Refundments due to death or withdrawal	98,388.00	
	(c) Benefits already authorized	9,764.00	1,779,835.00
8.	Present Value of Refundments to former members without vested rights		459,270.00
9.	Present Value of Benefits Payable to Annuitants:		
	(a) Retirement Benefits	$ 35,681,044.00	
	(b) Disability Benefits	1,434,585.00	
	(c) Survivors' Benefits	371,055.00	37,486,684.00
10.	TOTAL LIABILITIES		$216,459,740.48

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 5.01% of members' salaries. After deducting the members' share of 3%, the State's share of the entry age normal cost contribution amounts to 2.01% of members' salaries.

Item 3(b) The portion attributable to the balance of the State's "matching" 3% contribution (.99% of members' salaries less .19% for operating expenses) which is more than sufficient to fund the Unfunded Accrued Liability.

Item 3(c) The portion attributable to the State's "additional" 2% contribution. The negative amount shows that the State no longer needs to make the additional 2% 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, 1968 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 actuarially computed present value of all benefits payable from the System with respect to members who have retired.

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 3-1/2% interest assumption rather than the 3% 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, 1968

3-1/2% INTEREST RATE ASSUMPTION

Assets			
1.	Cash in Office		$ 25.00
2.	Deposits in Banks		64,207.80
3.	Short Term Investments		3,598,248.03
4.	Accounts Receivable:		
	(a) Members' Contributions	$200,480.29	
	(b) Employer Contributions	318,879.47	
	(c) Other	202,498.85	721,858.61
5.	Accrued Interest on Investments		1,061,956.47
6.	Dividends declared but not received		36,756.34
7.	Bonds at Amortized Cost		78,653,093.85
8.	Stocks at Cost (Market Value 12/31/68 - $41,035,809.00)		35,158,642.59
9.	Equipment at Cost, less depreciation		7,581.74
10.	Other - Prepaid postage		2,000.00
11.	TOTAL ASSETS		$119,304,370.43
Unfunded Accrued Liability			
12.	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		$ 13,413,355.00
13.	Unfunded Accrued Liability to be funded by State's 2% "Additional" contribution		(259,121.95)
14.	Total Unfunded Accrued Liability		$ 13,154,233.05
15.	TOTAL ASSETS AND UNFUNDED ACCRUED LIABILITY		$132,458,603.48

CURRENT LIABILITIES AND RESERVES REQUIRED

Current Liabilities			
16.	Accounts Payable:		
	(a) Annuity Payments	$ 3,220.82	
	(b) Survivor Payments	2,868.97	
	(c) Refunds to members	9,845.49	
	(d) Accrued expenses and overpaid dividends	20,178.64	$ 36,113.92
17.	Suspense items		2,783.72
18.	Refundments due National Guard Technicians		1,320,756.84
19.	Total Current Liabilities		$ 1,359,654.48
Reserves Required			
20.	Total Reserves Required per attached schedule		131,098,949.00
21.	TOTAL CURRENT LIABILITIES AND RESERVES REQUIRED		$132,458,603.48

Note: Accumulated contributions, without interest, of members not yet retired amounted to $35,390,037.88 as of December 31, 1968.

MINNESOTA STATE RETIREMENT SYSTEM

DETERMINATION OF RESERVES REQUIRED AS OF DECEMBER 31, 1968

3-1/2% 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	$132,891,269.00	$51,641,418.00	$ 81,249,851.00
(b) Disability Benefits	13,289,450.00	8,383,347.00	4,906,103.00
(c) Refundments due to death or withdrawal	29,193,578.00	23,976,372.00	5,217,206.00
2. Deferred Annuitants	1,779,835.00	-	1,779,835.00
3. Former Members Without Vested Rights	459,270.00	-	459,270.00
4. Annuitants:			
(a) Retirement Benefits	35,681,044.00	-	35,681,044.00
(b) Disability Benefits	1,434,585.00	-	1,434,585.00
(c) Survivors' Benefits	371,055.00	-	371,055.00
5. TOTAL	$215,100,086.00	$84,001,137.00	$131,098,949.00

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, 1968

ANALYSIS OF INCOME AND DEDUCTIONS FROM INCOME

3-1/2% INTEREST RATE ASSUMPTION

INCOME		
1. From Members:		
(a) Employee contributions		$ 5,804,936.45
(b) Employee accrued contributions receivable		200,480.29
(c) Employee contributions applied to past due payments		19,583.88
2. From Employers:		
(a) Employer contributions		5,757,555.89
(b) Employer additional contributions		3,746,915.73
(c) Employer accrued contributions receivable		318,879.47
(d) Employer past due contributions receivable		183,452.13
3. From Investments:		
(a) Interest on bonds and notes (net)		3,640,329.43
(b) Dividends on corporate stocks		1,145,218.94
(c) Premiums on bonds called		2,587.49
4. Other Revenues:		
(a) Interest on back payments by members		4,128.02
(b) Employer payments in lieu of interest		319.46
(c) Adjustments in prior year benefit payments		989.97
(d) Unclaimed contributions and benefits cancelled into fund		221.01
5. Net Gain on Sale of Investments		93,792.83
6. TOTAL INCOME		$20,919,390.99
DEDUCTIONS FROM INCOME		
7. Benefits:		
(a) Annuities, disability and retirement allowances		$ 4,099,851.96
(b) Survivor benefits		33,526.81
(c) Interest paid on deposits of deceased employees		69,361.81
8. Refundments:		
(a) Left service		1,665,063.99
(b) Coverage by other retirement systems		1,362,147.48
(c) Employee deaths		254,949.74
(d) Annuitant deaths		50,638.23
(e) Erroneous deductions		8,263.31
9. Operating Expenses		329,320.97
10. Write-off of employer contribution receivable for National Guard Technicians		1,220,154.39
11. Increase in Total Reserves Required:		
(a) Reserves Required 12-31-67	$124,908,157.00	
(b) Reserves Required 12-31-68	131,098,949.00	6,190,792.00
12. TOTAL DEDUCTIONS FROM INCOME		$15,284,070.69
13. EXCESS OF INCOME OVER DEDUCTIONS FROM INCOME		$ 5,635,320.30
14. REDUCTION IN UNFUNDED ACCRUED LIABILITY:		
(a) Unfunded Accrued Liability 12-31-67	$ 18,789,553.35	
(b) Unfunded Accrued Liability 12-31-68	13,154,233.05	$ 5,635,320.30