GEORGE V. STENNES
FELLOW, SOCIETY OF ACTUARIES

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CHANDLER L. MCKELVEY
ASSOCIATE, SOCIETY OF ACTUARIES

FEDERAL 9-8789

GEORGE V. STENNES AND ASSOCIATES
CONSULTING ACTUARIES
1488 NORTHWESTERN BANK BUILDING
MINNEAPOLIS 2, MINN.

May 1, 1958

Minnesota Highway Patrolmen's Retirement Association
1246 University Avenue
St. Paul 4, Minnesota

Gentlemen:

Pursuant to your request an actuarial valuation of your fund has been prepared. The results of the valuation have been summarized in the following pages together with other statistical data required by law.

I certify that all calculations in respect to the valuation were performed on the basis of the assumptions outlined in this report and that the results are true and correct to the best of my knowledge.

Respectfully submitted,

George V. Stennes

George V. Stennes
Fellow, Society of Actuaries

GVS:gk

FILE COPY

INTRODUCTION

In accordance with Chapter 11 of the Minnesota Special Session Laws of 1957, an actuarial survey as of January 1, 1958, has been made of the

Minnesota Highway Patrolmen's Retirement Association

The survey covers the membership of the Fund as shown in the census of members and survivors of deceased members which is included in this report. The details of the benefits under the plan as well as membership data were furnished by the Fund.

This report covers the following items:

A. Benefits of Plan.

B. Assumptions in Actuarial Valuation.

C. Results of Survey.

D. Discussion of Results.

E. Census of Membership.

A. BENEFITS OF PLAN

The plan provides the following major benefits.

1. Retirement benefit.

   a. Requirements for retirement.

      Age 55, 10 years' service

   b. Monthly annuity when minimum requirements are met.

      Years of service times $10

   c. Additional monthly annuity after minimum requirements are met.

      $10 additional per year through 20 years, $3 additional per year over 20 years

2. Disability benefit (monthly annuity).

   $200 plus $3 for each year of service over 20 years. Ten years service required if not service connected

3. *Widow's benefit (monthly annuity).

   $75

4. *Surviving children's benefit (monthly annuity).

   $20

5. Other death benefit (lump sum).

   None

* The combined widow's and children's benefit is limited.

B. ASSUMPTIONS IN ACTUARIAL VALUATION

1.	Mortality:	United States Life Tables, 1949-51 (White Males and White Females) These tables were used for both active and retired members, and for survivors.
2.	Disability:	The rates of disability were adapted from recent experience of the New York State Employees' Retirement System, graduated and extrapolated as required for this survey.
3.	Withdrawal:	A rate of withdrawal of .050 at age 20 decreasing uniformly to zero at age 45 with no withdrawals after that age.
4.	Salary scale:	No prediction of future salaries made except for assumption (where applicable) that salary at retirement of recent entrants will be the same as that for members of long service.
5.	Retirement age:	The assumed average age at retirement for this fund was **57.9**
6.	Interest:	3%, compounded annually.

It is felt that these assumptions are appropriate for the valuation of this fund on a realistic basis.

C. RESULTS OF SURVEY

1.	Valuation.	
	Normal cost of benefits	$ 274,276
	Required reserve	4,014,041
2.	Current deficit from full funding.	
	Required reserve	$ 4,014,041
	*Assets in fund	1,226,695
	Deficit	$ 2,787,346
3.	Annual payment to achieve full funding by 1997.	
	Annual deposit to retire deficit by 1997.	$ 120,581
	Total normal cost	274,276
	Total annual payment	$ 394,857
4.	Minimum contribution to prevent increase in deficit.	
	Interest on deficit at 3%	$ 83,620
	Total normal cost	274,276
	Minimum contribution	$ 357,896
5.	*Income of fund in 1957.	
	Members' contributions	$ 83,742
	Taxes or public funds	83,742
	Other	0
	Total contributions	$ 167,484
	Investment return	$ 31,324
6.	*Annual payroll as of January 1, 1958.	$ 1,582,320

*Data furnished by Fund.

D. DISCUSSION OF RESULTS

The valuation was made by a method known as the entry age normal cost method. Under this method, a normal cost corresponding to the hiring age of each member is determined. This normal cost is the annual deposit required (under the assumptions outlined) to pay for the cost of the member's prospective benefits over the period from the date of hiring to the date of retirement.

When a retirement plan is fully funded, the fund contains an amount equal to the accumulation (under the assumptions made) of the normal cost for each member from the date of hiring to the date of valuation. This accumulation is called the accrued liability or the required reserve. A retirement plan which is fully funded requires future contributions no larger than the sum of the normal cost of all active members to pay for the prospective benefits (if the assumptions made are realized exactly).

To the extent that normal costs have not been paid, a plan is not fully funded. The amount by which the plan is short of full funding is called the unfunded liability or the deficit of the fund. In other words, the deficit is the excess of the required reserve over the actual assets of the fund.

In addition to the current normal cost of the fund, the 1957 law referred to in the Introduction requires a determination of the additional annual contribution necessary to retire or eliminate the deficit by the end of 1997. Payment of this amount each year in addition to the normal cost would result in full funding of the present plan with no deficit by the end of 1997, provided that experience follows the assumptions outlined. In order for the fund to accomplish this result, an annual deposit of the amount stated in item 3 of Section C is required.

The deficit in the fund will increase unless at least 3% interest on the deficit is paid each year in addition to the normal cost. The sum of these two amounts should be regarded as the minimum annual contribution to the fund in order to keep the deficit at its present size. For this fund, the minimum contribution is shown in item 4 of Section C.

E. CENSUS OF MEMBERSHIP

Summary of membership and survivors of deceased members.

Status	Number
Active members	329
Deferred annuitant members	22
Retired members	15
Disabled members	2
Widows of deceased members	4
Children of deceased members	0
	372

		Year of: Birth	Year of: Empl.	Salary	Contrib.	Pension
91	1	00	36	$0490.	$357.	$20600
91	1	01	36	0425	357	20600
91	1	01	40	0415	348	20000
91	1	02	31	0530	357	21800
91	1	02	38	0480	357	20000
91	1	03	31	0530	357	22100
91	1	03	33	0425	357	21500
91	1	03	36	0425	357	20600
91	1	03	37	0425	357	20300
91	1	03	38	0415	357	20000
91	1	04	30	0490	357	22700
91	1	04	31	0415	348	22400
91	1	04	33	0425	357	21800
91	1	04	33	0570	357	21800
91	1	05	36	0425	357	21200
91	1	05	42	0415	348	20000
91	1	06	30	0425	357	23300
91	1	06	31	0425	357	23000
91	1	06	33	0425	357	22400
91	1	06	33	0590	357	22400
91	1	06	33	0425	357	22400
91	1	06	33	0490	357	22400
91	1	06	33	0425	357	22400
91	1	06	36	0425	357	21500
91	1	06	37	0425	357	21200
91	1	06	37	0425	357	21200
91	1	06	39	0415	348	20600
91	1	07	31	0425	357	23300
91	1	07	31	0530	357	23300
91	1	07	31	0425	357	23300
91	1	07	31	0425	357	23300
91	1	07	36	0415	348	21800
91	1	07	36	0425	357	21800
91	1	07	37	0415	348	21500
91	1	08	36	0425	357	22100
91	1	08	36	0425	357	22100
91	1	08	42	0415	340	20300
91	1	08	43	0415	348	20000
91	1	09	36	0425	357	22100
91	1	09	36	0530	357	22400
91	1	09	37	0415	348	21800
91	1	09	40	0415	348	21200
91	1	09	42	0415	348	20300
91	1	09	42	0415	348	20600
91	1	10	33	0425	357	23600
91	1	10	36	0425	357	22700
91	1	10	36	0425	357	22700
91	1	10	36	0425	357	22700
91	1	10	41	0415	348	21200
91	1	10	42	0415	209	20900
91	1	10	48	0405	340	20000
91	1	11	33	0425	357	23900
91	1	11	36	0425	357	23000
91	1	11	36	0490	357	23000
91	1	11	36	0425	357	23000
91	1	11	36	0425	357	23000
91	1	11	42	0600	357	21200

91	1	12	34	$0425.	$357.	$239.00
91	1	12	36	0425	357	23300
91	1	12	42	0415	348	21500
91	1	12	42	0415	340	21500
91	1	13	36	0425	357	23600
91	1	13	36	0770	357	23600
91	1	13	38	0480	357	23000
91	1	13	42	0415	348	21800
91	1	13	42	0415	348	21800
91	1	13	42	0480	357	21800
91	1	13	43	0415	348	21500
91	1	13	47	0425	357	20300
91	1	14	36	0490	357	23900
91	1	14	37	0520	357	23600
91	1	14	40	0520	357	22700
91	1	14	41	0405	340	22400
91	1	14	41	0520	357	22400
91	1	14	44	0355	298	21500
91	1	14	57	0850	357	17000
91	1	15	41	0415	348	22700
91	1	15	42	0520	357	22400
91	1	15	42	0480	357	22400
91	1	15	42	0415	348	22400
91	1	15	48	0405	340	20600
91	1	15	48	0405	340	20600
91	1	16	42	0415	348	22700
91	1	16	42	0415	348	22700
91	1	16	42	0405	340	22700
91	1	16	42	0480	357	22700
91	1	16	43	0480	357	22400
91	1	16	52	0405	340	20000
91	1	16	53	0395	331	20000
91	1	17	42	0415	348	33000
91	1	17	42	0415	348	23000
91	1	17	48	0405	340	21200
91	1	17	48	0405	340	21200
91	1	17	51	0405	340	20300
91	1	17	52	0405	340	20000
91	1	17	52	0405	340	20000
91	1	18	42	0415	348	23300
91	1	18	48	0470	357	21500
91	1	18	50	0405	340	20900
91	1	18	55	0375	315	20000
91	1	19	48	0405	340	21800
91	1	19	48	0405	340	21800
91	1	19	52	0405	340	20600
91	1	19	52	0405	340	20300
91	1	19	52	0405	340	20600
91	1	19	54	0385	323	20000
91	1	19	54	0385	323	20000
91	1	20	48	0405	340	22100
91	1	20	48	0470	357	22100
91	1	20	50	0470	357	21500
91	1	20	51	0405	340	21200
91	1	20	52	0405	340	20900
91	1	20	52	0405	340	20900
91	1	20	52	0405	340	20900

91	1	21	51	$0405	$340.	$21500
91	1	21	52	0405	340	21200
91	1	21	52	0405	340	21200
91	1	21	52	0405	340	21200
91	1	21	52	0405	340	21200
91	1	21	52	0405	340	21200
91	1	21	57	0355	298	20000
91	1	21	57	0355	298	20000
91	1	22	49	0405	340	22400
91	1	22	52	0405	340	21500
91	1	22	52	0405	340	21500
91	1	22	52	0405	340	21500
91	1	22	52	0405	340	21500
91	1	22	52	0405	340	21500
91	1	22	53	0395	331	21200
91	1	22	55	0375	315	20600
91	1	22	57	0355	298	20000
91	1	22	57	0355	298	20000
91	1	22	57	0355	298	23000
91	1	23	50	0405	340	22400
91	1	23	50	0405	340	22400
91	1	23	52	0405	340	21800
91	1	23	52	0405	340	21800
91	1	23	52	0405	340	21800
91	1	23	52	0405	340	21800
91	1	23	52	0405	340	21800
91	1	23	52	0405	340	21800
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91	1	23	55	0375	315	20900
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91	1	24	48	0470	357	23300
91	1	24	48	0405	340	23300
91	1	24	51	0405	340	22400
91	1	24	52	0405	340	22100
91	1	24	52	0405	340	22100
91	1	24	52	0395	331	22100
91	1	24	52	0405	340	22100
91	1	24	52	0405	340	22100
91	1	24	54	0385	323	21500
91	1	24	54	0385	323	21500
91	1	24	55	0375	315	21200
91	1	24	55	0375	315	21200
91	1	24	55	0365	306	21200
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91	1	24	57	0355	298	20600
91	1	24	57	0355	298	20600
91	1	24	57	0355	298	20600
91	1	25	48	0405	340	23600
91	1	25	51	0405	340	22700
91	1	25	52	0470	357	22400
91	1	25	52	0405	340	22400
91	1	25	52	0405	340	22400
91	1	25	52	0405	340	22400

91	1	25	52	$0405.	$340.	$224.00
91	1	25	52	0405	340	22400
91	1	25	54	0405	340	21800
91	1	25	55	0375	315	21500
91	1	25	55	0375	315	21500
91	1	25	55	0375	315	21500
91	1	25	55	0375	315	21500
91	1	25	57	0355	298	20900
91	1	25	57	0355	298	20900
91	1	25	57	0355	298	20900
91	1	25	57	0355	298	21500
91	1	25	57	0355	298	20900
91	1	25	57	0355	298	20900
91	1	25	57	0355	298	20900
91	1	26	48	0470	357	23900
91	1	26	51	0405	340	23000
91	1	26	51	0405	340	23000
91	1	26	52	0395	331	22400
91	1	26	52	0405	340	22700
91	1	26	52	0405	340	22700
91	1	26	52	0405	340	22700
91	1	26	52	0405	340	20900
91	1	26	52	0405	340	22700
91	1	26	52	0405	340	22700
91	1	26	52	0405	340	22700
91	1	26	52	0405	340	22700
91	1	26	52	0405	340	22700
91	1	26	52	0405	340	22700
91	1	26	52	0405	340	22700
91	1	26	54	0385	323	22100
91	1	26	55	0375	315	21800
91	1	26	55	0375	315	21800
91	1	26	55	0375	315	21800
91	1	26	55	0375	315	21800
91	1	26	55	0375	315	21800
91	1	26	55	0375	315	21800
91	1	26	55	0375	315	21800
91	1	26	57	0355	298	21200
91	1	26	57	0355	298	21200
91	1	26	57	0355	298	21200
91	1	26	57	0355	298	21200
91	1	26	57	0355	298	21200
91	1	27	52	0405	340	23000
91	1	27	52	0405	340	23000
91	1	27	52	0405	340	23000
91	1	27	52	0405	340	23000
91	1	27	52	0405	340	23000
91	1	27	54	0385	323	22400
91	1	27	54	0385	323	22400
91	1	27	55	0375	315	22100
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91	1	27	57	0355	298	21500
91	1	27	57	0355	298	21500
91	1	27	57	0355	298	21500
91	1	27	57	0355	298	21500
91	1	27	57	0355	298	21500
91	1	27	57	0355	298	24500

91	1	27	57	$0355.	$298.	$215.00
91	1	27	57	0355	298	24500
91	1	28	52	0405	340	23300
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91	1	28	52	0405	340	23300
91	1	28	53	0385	323	23000
91	1	28	54	0385	323	22700
91	1	28	54	0385	323	22700
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91	1	28	55	0375	315	22400
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91	1	28	57	0355	298	21800
91	1	28	57	0355	298	22400
91	1	28	57	0355	298	21800
91	1	28	57	0355	298	21800
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91	1	28	57	0355	298	21800
91	1	28	57	0355	298	21800
91	1	29	52	0405	236	23600
91	1	29	54	0405	348	23000
91	1	29	54	0385	331	23000
91	1	29	54	0385	323	22700
91	1	29	54	0385	323	23000
91	1	29	54	0375	315	23000
91	1	29	55	0375	315	22700
91	1	29	55	0375	315	22700
91	1	29	55	0375	315	22700
91	1	29	55	0375	315	22700
91	1	29	56	0375	315	22400
91	1	29	57	0355	298	22100
91	1	29	57	0355	298	22100
91	1	29	57	0355	298	22100
91	1	29	57	0355	298	22100
91	1	29	57	0355	298	22100
91	1	29	57	0355	298	22100
91	1	30	54	0385	323	23300
91	1	30	55	0375	315	23000
91	1	30	55	0375	315	23000
91	1	30	55	0375	315	33000
91	1	30	55	0375	315	23000
91	1	30	55	0375	315	23000
91	1	30	55	0375	315	23000
91	1	30	55	0375	315	23000
91	1	30	55	0375	315	23000
91	1	30	57	0355	298	22400
91	1	30	57	0355	298	22400
91	1	30	57	0355	298	22400
91	1	30	57	0355	298	22400
91	1	30	57	0355	298	22400
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91	1	31	54	0385	323	23600
91	1	31	55	0375	315	23300
91	1	31	55	0375	315	23300
91	1	31	55	0365	306	22700
91	1	31	57	0355	298	22700
91	1	31	57	0355	298	22700
91	1	31	57	0355	298	22700

91	1	31	57	$0355.	$298.	$22700
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91	1	32	55	0375	315	23600
91	1	32	56	0365	306	23300
91	1	32	57	0355	298	23000
91	1	32	57	0355	298	23000
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91	1	32	57	0355	298	23300
91	1	32	57	0355	298	23000
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91	1	32	57	0355	298	23000
91	1	32	57	0355	298	23000
91	1	33	53	0355	298	23300
91	1	33	55	0375	315	23900
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	33	57	0355	298	23300
91	1	34	55	0375	315	21200
91	1	34	57	0355	298	23600
91	1	34	57	0355	298	23600
91	1	34	57	0355	298	23600
91	1	35	57	0355	298	23900
91	1	35	57	0355	298	23900
91	1	35	57	0355	298	23900
91	1	35	57	0355	298	23900
91	1	35	57	0355	298	23900
91	1	99	31	0530	357	23300
91	1	99	33	0570	357	21500

$72,94500*

329*

Minnesota Highway Patrolmen's Retirement Association - Census of Retired Member

		Year of Birth	Pension
91	2	01	$ 215.00
91	2	02	20900
D 91	2	13	20300
D 91	2	~~87~~ 02	20900
91	2	91	20000
91	2	94	20600
91	2	95	21800
91	2	95	21200
91	2	96	21500
91	2	96	22100
91	2	97	20900
91	2	97	20000
91	2	97	20000
91	2	97	20300
91	2	98	20900
91	2	98	20600
91	2	99	20000
		*	$3,535.00

D - Disability Pension

17 *

Minnesota Highway Patrolmen's Retirement Association - Census of Deferred Annuitants

		Year of Birth	Pension
91	3	02	$200.00
91	3	03	21500
91	3	04	18000
91	3	05	20900
91	3	05	21200
91	3	05	18000
91	3	06	20300
91	3	07	20000
91	3	07	18000
91	3	08	15000
91	3	09	20000
91	3	09	15000
91	3	09	15000
91	3	10	15000
91	3	11	13000
91	3	12	15000
91	3	13	12000
91	3	13	12000
91	3	16	15000
91	3	17	14000
91	3	18	14000
91	3	19	14000
		*	$3,669.00 *
			22 *

Minnesota Highway Patrolmen's Retirement Association - Census of Widwos of Deceased Members

		Year of Birth	Pension
91	4	00	$ 97.75
91	4	93	9775
91	4	96	9775
91	4	97	9775
		*	$391.00 *

4*