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# Virginia Police Relief Association

## Annual Actuarial Valuation

December 31, 1988

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Saint Paul, Minnesota 55155

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May 31, 1989

Board of Trustees  
Virginia Police Relief Association  
Virginia, Minnesota

Submitted in this report are the results of the December 31, 1988 actuarial valuation of the assets, actuarial values and contribution requirements associated with the benefits provided by the Virginia Police Relief Association.

The valuation results contained in Section A provide the actuarial information needed to determine the employer's "minimum obligation" effective January 1, 1990. Section A also contains comments regarding the valuation results.

The valuation was based upon information furnished by the Association concerning benefits, financial transactions, active members, terminated members, retirants and beneficiaries. Data was checked for year to year consistency but was not otherwise audited by us. This information is summarized in Section B.

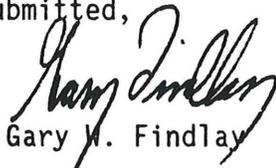
A description of the actuarial funding method and the risk experience assumptions used is contained in Section C. The economic risk experience assumptions, as well as the actuarial funding method to be used, are established by state law.

Information needed to comply with Statement No. 5 of the Governmental Accounting Standards Board is contained in Section D.

The actuarial valuation was prepared using generally accepted actuarial principles and practices based upon the methods, assumptions, summary of plan provisions and the member and financial data described in this report.

Respectfully submitted,

  
J. Daniel Petersen

  
Gary M. Findlay

**SECTION A**

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**Valuation Results**

## COMMENTS

### Economic Assumptions and Financing Method

The economic assumptions of 5% annual investment return and 3-1/2% annual salary increases are established by state law. State law also specifies that the annual minimum obligation of the municipality shall be determined by adding (i) the employer normal cost percent times covered payroll to (ii) the level dollar amount required to amortize the unfunded actuarial accrued liability by December 31, 2010.

It is worth noting that when the same assumptions and methods are applied to plans which differ in nature, the valuation results may not be comparable. Caution should be exercised when attempting to assess the financial condition of one Association relative to another on the basis of valuation results produced using the assumptions and methods mandated by state law.

Virginia Police Relief Association  
 CONTRIBUTION RATE TO PROVIDE BENEFITS

Member portion & Employer portion  
 Effective January 1, 1990

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Contributions for	If Paid Equally Throughout Year Normal Cost % of Active Payroll for 1990	+	UAAAL Dollars
Normal cost of annuities:			
Age & service: to members	15.72%		
Age & service: to survivors	2.67		
Disability	3.18		
Death before retirement	2.05		
Refunds of member contributions	0.30		
Total Normal Cost	23.92%		
Amortization of unfunded actuarial accrued liabilities (UAAAL) (21 year level dollar payment)			
Retired lives			\$ 0
Active members			25,109
Total			25,109
Total Cost of Benefits	23.92%	+	\$25,109
Member contributions	8.00%		
COMPUTED EMPLOYER RATE:			
(a) If Paid Equally Throughout Year	15.92%	+	\$25,109
(b) IF PAID AT CALENDAR YEAR END	16.31%	+	\$25,729

Virginia Police Relief Association  
 Computed Contributions - Comparative Schedule

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Year Ended December 31		Total Normal Cost as a Percent of Valuation Payroll*	Contribution For Unfunded Actuarial Accrued Liabilities
Valuation	Fiscal		\$ or %
1979	1981	N/A%	\$ N/A
1980	1982	23.17	67,101
1981	1983	N/A	N/A
1982	1984	23.36	68,903
1983	1985	23.32	78,593
1983	1985**	25.38	95,100
1984	1986	25.15	78,226
1985	1987	23.55	66,771
1985	1987#	23.55	67,971
1986	1988	23.64	52,921
1987	1989	23.76	43,520
1988	1990	23.92	25,109

\* Includes employee contributions.

\*\* After change in assumptions.

# After plan amendment.

**SECTION B**

Type of Annuity Being Paid	No.	Monthly Amounts	Accrued Liabilities
<b>Retirees receiving:</b>			
Age & Service	10	\$11,811.00	\$1,878,044
Disability	0	0.00	0
<b>Beneficiaries receiving:</b>			
Spouse	5	2,729.97	391,164
Child	0	0.00	0
<b>Totals</b>	<b>5</b>	<b>2,729.97</b>	<b>391,164</b>
<b>Totals</b>	<b>15</b>	<b>\$13,941.29</b>	<b>\$2,369,208</b>

**Valuation Data and  
 Summary of Benefit Provisions**

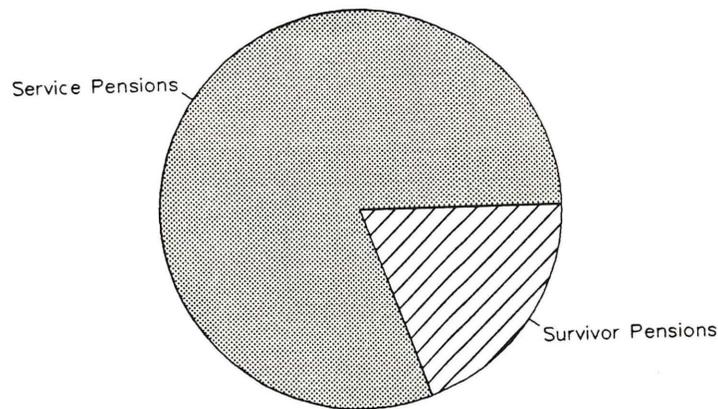


Monthly Amounts Paid by Benefit

Virginia Police Relief Association  
 Retirants and Beneficiaries December 31, 1988  
 By Type of Annuity Being Paid

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<u>Type of Annuity Being Paid</u>	<u>No.</u>	<u>Monthly Amounts</u>	<u>Computed Actuarial Accrued Liabilities</u>
Retirants receiving:			
Age & Service	10	\$11,211.23	\$1,978,044
Disability	<u>0</u>	<u>0.00</u>	<u>0</u>
Totals	10	11,211.23	1,978,044
Beneficiaries receiving:			
Spouse	6	2,729.97	391,164
Child	<u>0</u>	<u>0.00</u>	<u>0</u>
Totals	6	2,729.97	391,164
Totals	16	\$13,941.20	\$2,369,208



Monthly Amount Paid by Benefit

Virginia Police Relief Association  
Inactive Members Eligible for Deferred Benefits  
December 31, 1988

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<u>No.</u>	<u>Monthly Amount</u>	<u>Computed Actuarial Accrued Liabilities</u>
1	\$1,246.00	\$164,016

Virginia Police Relief Association  
 Retirants and Beneficiaries December 31, 1988  
 By Attained Ages

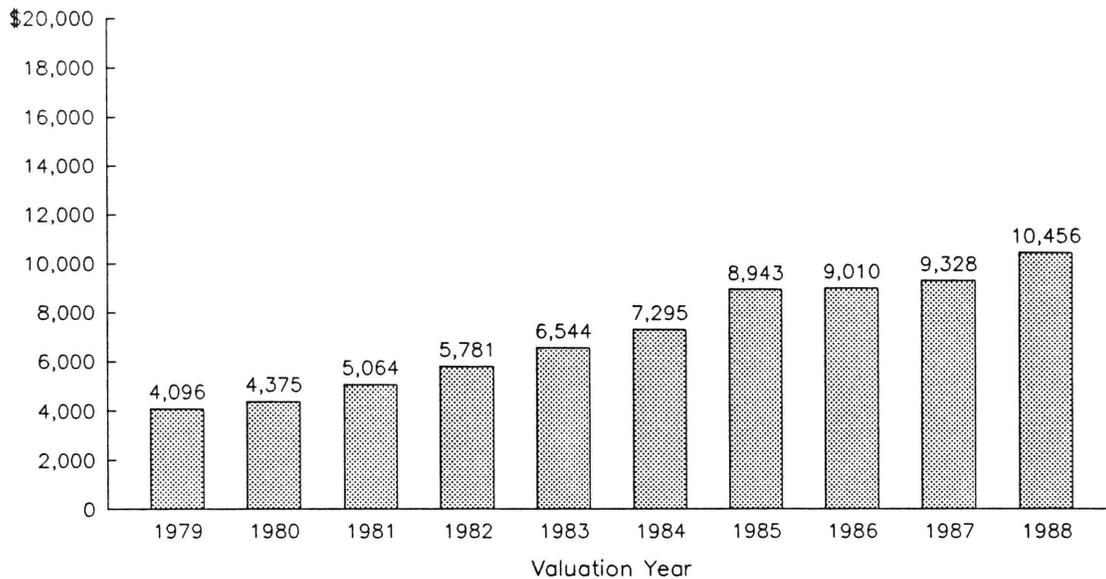
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<u>Attained Ages</u>	Number		
	<u>Age &amp; Service</u>	<u>Disability</u>	<u>Death Before Retirement</u>
55-59	3		
60-64	3		
65-69	3		
70-75		1	
75-79	1		
80-84	4		
85-89	<u>1</u>	—	—
Totals	15	1	0

Virginia Police Relief Association  
 Retirants and Beneficiaries Added to and Removed from Rolls  
 Comparative Statement

Valuation Date December 31	No. Added to Rolls	No. Removed from Rolls	Rolls End of Year		Discounted Value of Total Allowances
			No.	Annual Allowances	
1979	1	2	17	\$ 69,640	\$ 924,986
1980			17	74,379	960,671
1981	1	1	17	86,085	981,184
1982			17	98,273	1,060,993
1983	3	4	16	104,704	1,561,519
1984	1	1	16	116,713	1,736,472
1985	3		19	169,926	2,599,608
1986	1	1	19	171,195	2,529,648
1987		1	18	167,901	2,414,664
1988		2	16	167,294	2,369,208

Average Annual Allowances



Virginia Police Relief Association  
Active Members December 31, 1988  
By Attained Age and Years of Service

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Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
25-29		1						1	\$ 28,371
30-34		1						1	27,861
35-39		1	5					6	175,886
40-44				1	1			2	70,605
45-49				1				1	30,074
50-54							1	1	35,591
62				1				1	26,271
Totals		3	5	3	1		1	13	\$394,659

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 40.8 years.

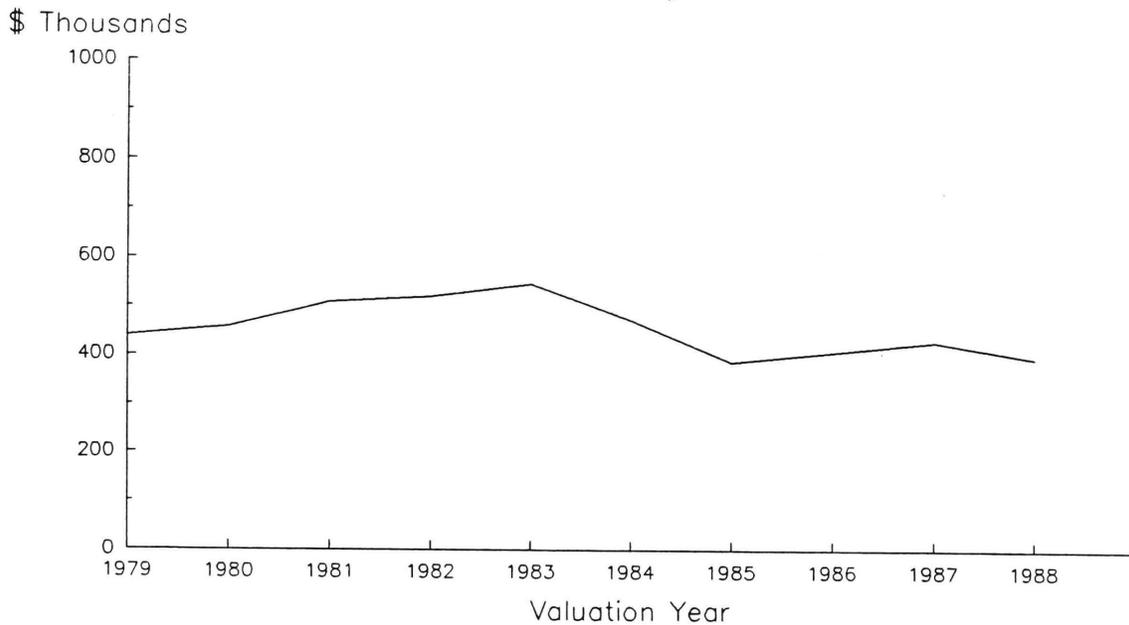
Service: 15.2 years.

Annual Pay: \$30,358.

Virginia Police Relief Association  
 Comparative Schedule  
 Of Active Members

Valuation Date December 31	Active Members	Valuation Payroll	Average			
			Age	Service	Pay	% Incr.
1979	26	\$438,629	35.0 yrs.	8.9 yrs.	\$16,870	4.8%
1980	24	456,790	36.6	9.6	19,033	12.8
1981	22	507,821	38.2	11.0	23,083	21.3
1982	21	518,012	39.2	12.5	24,667	6.9
1983	20	544,128	39.7	12.9	27,206	10.3
1984	17	469,699	40.9	14.2	27,629	1.6
1985	14	385,592	38.2	12.6	27,542	(0.3)
1986	14	406,161	39.2	13.6	29,012	5.3
1987	14	427,687	40.2	14.6	30,549	5.3
1988	13	394,659	40.8	15.2	30,358	(0.6)

Valuation Payroll



Virginia Police Relief Association

Brief Summary (12/31/88) of Benefit Provisions Evaluated and/or Considered

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Age & Service Retirement

Eligibility. 20 years of service and 50 years of age.

Amount. 50% of the prevailing pay of the rank held for at least 6 months prior to retirement. For each year over 25, an additional 1/2% of pay used for retirement purposes is added to the benefit. (The additional benefit is not subject to the post-retirement adjustment provisions.)

Disability Retirement

Eligibility. Disabled to the extent that no longer able to perform the duties of police officer.

Amount. Same as regular retirement benefit.

Member's Death While Active, Or In Deferred Status, Or Retired

Eligibility.

Spouse. Legally married to member at separation from service and residing with member at time of death. Benefits terminate upon remarriage.

Child. Younger than age 18.

Amount.

Spouse. 50% of regular retirement benefit.

Child. \$600 per child per year.

Maximum Family Benefit. Regular retirement benefit amount.

Vested Deferred. 20 years of service and separated before age 50. Payment beginning is deferred to attainment of age 50.

Post-Retirement Adjustments ("Escalator"). Each time prevailing pay is changed, retired member and surviving spouse benefits are simultaneously changed by the same percent that prevailing pay changes. Adjustments are applicable only to those who retire after January 12, 1966, and are not applied to children's benefits.

Member Contributions. 8% of prevailing pay. Total contributions are refundable, without interest, if no monthly benefit is payable upon separation from service.

**SECTION C**

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**Valuation Methods and  
Assumptions**

Virginia Police Relief Association

Valuation Methods and Assumptions

The Entry Age Normal Cost method was used to determine the normal cost of all benefits. The rate of investment return (interest) as required by state law used in making the valuation was 5.0 percent per annum, compounded annually. Age & service retirement was assumed to occur at age 58, attained age if older.

Mortality Table\*

Sample Ages	Single Life Values: Present Value of \$1 Monthly				Future Life Expectancy (Years)	
	Level		Increasing		Men	Women
	For Life		3.5% Yearly			
	Men	Women	Men	Women		
45	\$177.21	\$189.58	\$280.82	\$314.75	29.50	34.00
50	163.12	177.21	246.55	280.82	25.20	29.50
55	147.50	163.12	212.60	246.55	21.16	25.20
60	130.52	147.50	179.49	212.60	17.42	21.16
65	112.87	130.52	148.28	179.49	14.05	17.42
70	95.20	112.87	119.70	148.28	11.09	14.05
75	77.77	95.20	93.83	119.70	8.52	11.09
80	61.71	77.77	71.69	93.83	6.39	8.52

\* UP-1984 Table set forward 2 years for males and set back 3 years for females.

Sample Rates of Separation from Active Employment  
Before Retirement, Death or Disability

Sample Ages	% of Active Members Separating within Next Year
20	1.50%
25	1.25
30	1.00
35	0.75
40	0.50
45	0.25
50+	0.00

Pay Adjustment Factor Used To Project Current Pays

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<u>Sample Ages</u>	<u>Present Pay Resulting in Pay of \$1,000 at Age 60</u>	<u>Present Increase in Pay During Next Year</u>
20	\$ 253	3.5%
25	300	3.5
30	356	3.5
35	423	3.5
40	503	3.5
45	597	3.5
50	709	3.5
55	842	3.5
60	1,000	3.5

Use of the pay adjustment factor illustrated above is required by state law.

Anticipated Disability Retirements

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<u>Sample Ages</u>	<u>% of Active Members Becoming Disabled within Next Year</u>
20	0.08%
25	0.08
30	0.08
35	0.08
40	0.20
45	0.26
50	0.49
55	0.89

**SECTION D**

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**The Pension Benefit Obligation and  
Certain Other Disclosures Required by  
Statement No. 5 of the  
Governmental Accounting Standards Board**

## PENSION BENEFIT OBLIGATION

The amount shown below as the "pension benefit obligation" is a standardized disclosure measure of the present value of pension benefits, adjusted for the effects of projected salary increases, estimated to be payable in the future as a result of employee service to date. The measure is the actuarial present value of credited projected benefits and is intended to (i) help users assess the plan's funding status on a going-concern basis, (ii) assess progress being made in accumulating sufficient assets to pay benefits when due, and (iii) allow for comparisons among public employee retirement plans. The measure is independent of the actuarial funding method used to determine contributions to the plan.

The pension benefit obligation was determined as part of an actuarial valuation of the plan as of December 31, 1988. Significant actuarial assumptions used in determining the pension benefit obligation include (a) a rate of return on the investment of present and future assets of 5.0% per year compounded annually, (b) projected salary increases of 3.5% per year compounded annually, attributable to inflation, (c) the assumption that benefits will increase 3.5% per year after retirement.

At December 31, 1988, the unfunded pension benefit obligation was \$202,721, determined as follows:

Pension Benefit Obligation:

Retirants and beneficiaries currently receiving benefits and terminated employees not yet receiving benefits	\$2,533,224
Current employees --	
Accumulated employee contributions including allocated investment income	285,161
Employer financed	<u>1,178,389</u>
Total Pension Benefit Obligation	\$3,996,774
Net assets available for benefits, at cost (market value was \$3,794,053)	<u>3,794,053</u>
Unfunded Pension Benefit Obligation	\$ 202,721

The total pension benefit obligation as of January 1, 1988 was \$3,908,796. During the year, the plan experienced a net change of \$87,978 in the pension benefit obligation.

CONTRIBUTIONS REQUIRED AND CONTRIBUTIONS MADE

The Association's funding policy provides for periodic employer contributions at actuarially determined rates that, expressed as percentages of annual covered payroll, are designed to accumulate sufficient assets to pay benefits when due. The normal cost and actuarial accrued liability are determined using an entry age actuarial funding method. Unfunded actuarial accrued liabilities are being amortized as a level dollar amount over a period of 21 years.

During the year ended December 31, 1988, contributions totaling \$203,876 -- \$169,985 employer and \$33,891 employee -- were made in accordance with contribution requirements determined by an actuarial valuation of the plan as of December 31, 1986. The employer contributions consisted of \$63,524 for normal cost and \$106,461 for amortization of the unfunded actuarial accrued liability. Employer contributions represented 41.85% of covered payroll.

Significant actuarial assumptions used to compute contribution requirements were the same as those used to compute the standardized measure of the pension benefit obligation.

Computed Contribution Comparative Schedule

Fiscal Year December 31	Valuation Date December 31	Contribution Rates			Dollar Contribution For Fiscal Year	
		Normal Cost % of Valuation Payroll	UAAL Dollars	Valuation Payroll	Computed	Actual
1987	1985	15.55%	\$67,971	\$385,592	\$127,931	\$159,414
1988	1986	15.64	52,921	406,161	116,445	169,985
1989	1987	15.76	43,520	427,687	110,923	
1990	1988	15.92	25,109	394,659	87,939	

REQUIRED SUPPLEMENTARY INFORMATION

ANALYSIS OF FUNDING PROGRESS

Valuation Date December 31	(1) Net Assets Available for Benefits	(2) Pension Benefit Obligation (PBO)	(3) Percent Funded (1)/(2)	(4) Unfunded PBO (2)-(1)	(5) Annual Covered Payroll	(6) Unfunded PBO as a Percentage of Covered Payroll (4)/(5)
1987	\$3,457,895	\$3,908,796	88.5%	\$450,901	\$427,687	105.4%
1988	3,794,053	3,996,774	94.9	202,721	394,659	51.4

Analysis of the dollar amounts of net assets available for benefits, pension benefit obligation, and unfunded pension benefit obligation in isolation can be misleading. Expressing the net assets available for benefits as a percentage of the pension benefit obligation provides one indication of the plan's funded status on a going-concern basis. Analysis of this percentage over time indicates whether the system is becoming financially stronger or weaker. Generally, the greater this percentage, the stronger the plan. The unfunded pension benefit obligation and annual covered payroll are both affected by inflation. Expressing the unfunded pension benefit obligation as a percentage of annual covered payroll approximately adjusts for the effects of inflation and aids analysis of the progress being made in accumulating sufficient assets to pay benefits when due. Generally, the smaller this percentage, the stronger the plan.

## APPENDICES

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## APPENDIX I

### FINANCIAL PRINCIPLES AND OPERATIONAL TECHNIQUES

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Promises Made, and Eventually Paid. As each year is completed, the plan in effect hands an "IOU" to each member then acquiring a year of service credit -- the "IOU" says: "The Pension Plan owes you a portion of your retirement benefits, payments to be made in cash, commencing when you qualify for retirement."

The related key financial questions are: Which generation of taxpayers contributes the money to cover the IOU? The present taxpayers, who receive the benefit of the member's present year of service? Or the future taxpayers, who happen to be in town paying taxes at the later time when the IOU becomes a cash demand?

A sound principle of sound retirement plan financing is to have this year's taxpayers contribute the money to cover the IOUs being handed out this year. By following this principle, THE CONTRIBUTION RATE WILL REMAIN APPROXIMATELY LEVEL FROM GENERATION TO GENERATION -- our children and grandchildren will contribute the same percents of active payroll we contribute now.

#### A PENSION PLAN BECOMES CLOSED

The diagram in this appendix shows two important activities which occur after a plan has been closed to employees hired in the future.

Cash benefits paid continue to increase for decades, while active member payroll begins to decrease to zero.

Funding Method. A funding method is the long-term, planned pattern for employer contributions.

For an open plan (a plan covering future employees), the level-percent-of-active-member payroll funding method is the basic funding method.

The level-percent funding method can also be applied to a closed plan. However, the resulting contribution percent usually jumps to a high rate, because the number of covered active members is decreasing.

A preferred funding method for a closed plan consists of: level-percent funding for normal cost (the cost of members' service now being rendered); plus a level dollar contribution for unfunded actuarial accrued liabilities over a limited period of years. The period of years must be limited so that plan assets don't become zero while benefits are still payable.

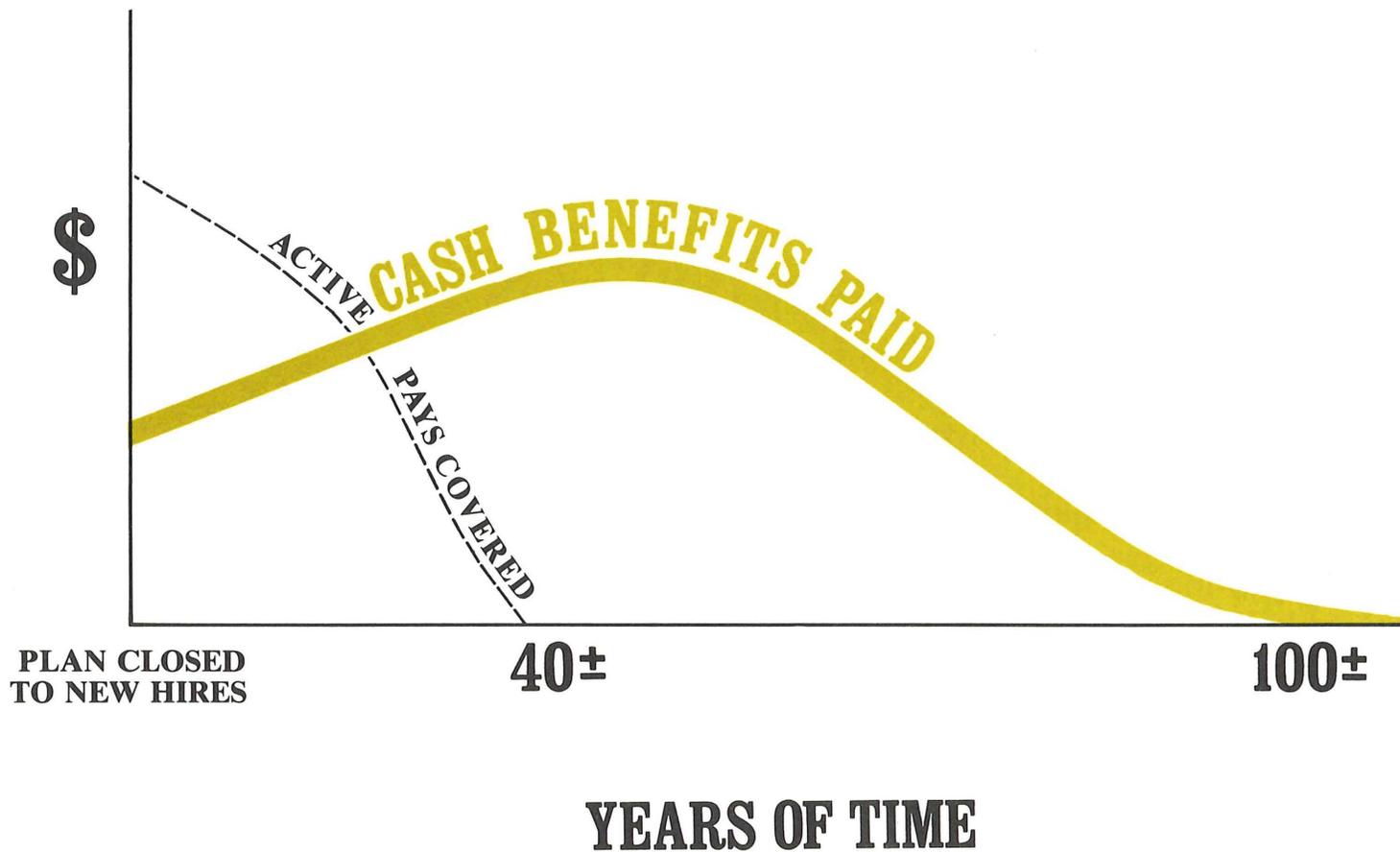
Computing Contributions To Support Plan Benefits. From a given schedule of benefits and from the employee data and asset data furnished him, the actuary determines the contribution rates to support the benefits by means of an actuarial valuation and a funding method.

In making an actuarial valuation, assumptions must be made regarding anticipated financial experiences for the next year and for decades in the future. Only the subsequent actual experience of the plan can indicate the degree of accuracy of the assumptions.

Reconciling Differences Between Assumed Experience and Actual Experience. Once actual experience has occurred and been observed, it will not coincide exactly with assumed experience, regardless of the wisdom of the assumptions or the skill of the actuary and the millions of calculations he made. The future can be predicted with considerable but not 100% precision, except for inflation which seems to defy reliable prediction.

A well-managed plan copes with these continually changing differences by having periodic actuarial valuations. Each actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is continuing adjustment in financial position.

# A CLOSED PENSION PLAN



A plan becomes closed when no new hires are admitted to active membership. The persons covered by the plan at the time of closing continue their normal activities and continue to be covered by the plan, until the last survivor dies.

**CASH BENEFITS LINE.** After a pension plan becomes closed, the usual pattern is for cash benefits to continue to increase for decades of time. Eventually the cash benefits will peak, and then gradually decrease over more decades of time, ultimately to zero. The last cash benefit is likely to occur a century after the time the plan is closed.

The precise amounts of cash benefits cannot be known now, and must be estimated by assumptions of future experiences in a variety of financial risk areas.

## APPENDIX II

### MEANING OF UNFUNDED ACCRUED LIABILITIES

Almost every pension plan (public or private) has "unfunded accrued liabilities", so whatever they are, they aren't rare. Since the term is not part of everyday conversation, it needs some definition.

"Accrued liabilities" are the present value \$ of plan promises to pay benefits in the future based upon service already rendered - - - a liability has been established ("accrued") because the service has been rendered, but the resulting monthly cash benefit may not be payable until years in the future. Accrued liabilities \$ are the result of complex mathematical calculations, which are made by the plan's actuary (which is the name given to the specialist who makes such calculations).

If "accrued liabilities" at any time exceed the plan's accrued assets (cash & investments), the difference is "unfunded accrued liabilities". This is the common condition. If the plan's assets equalled the plan's "accrued liabilities", the plan would be termed "fully funded". This is a rare condition.

Each time a plan adds a new benefit which applies to service already rendered, an "accrued liability" is created, which is also an "unfunded accrued liability" because the plan can't print instant cash to cover the accrued liability. Payment for such unfunded accrued liabilities is spread over a period of years, commonly in the 20-40 year range.

Unfunded accrued liabilities can occur in another way: If actual financial experience is less favorable than assumed financial experience, the difference is added to unfunded accrued liabilities. In plans where plan benefits are directly related to an employee's pay near time of retirement (a common plan provision) rather than his average pay throughout his working career, unfunded accrued liabilities have been increasing in recent years because unexpected rates of pay increase have created additional accrued liabilities which could not be matched by reasonable investment results. Some of these unexpected pay increases are the direct result of inflation, which is a very destructive force on financial stability.

The existence of unfunded accrued liabilities is not bad, then (any more than a mortgage on your house is "bad"), but the changes from year to year in amount of unfunded accrued liabilities are important - - - "bad" or "good" or somewhere in between.

Nor are unfunded accrued liabilities a bill payable immediately (your food costs are payable immediately), but it is important that policy-makers prevent the amount from becoming unreasonably high and it is vital that your plan have a sound method for making payments toward them so that they are controlled.

The existence of large amounts of unfunded accrued liabilities indicates that total contributions in past years were less than level - - - an almost certain history if retired life liabilities are not fully funded now.