Report of
AN ACTUARIAL VALUATION
December 31, 1985 of the
City of Minneapolis
Police Relief Association
Minneapolis, Minnesota

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GABRIEL, ROEDER, SMITH & COMPANY

ACTUARIES & CONSULTANTS

2090 First National Building
Detroit, Michigan 48226
Area 313: 961-3346

May 29, 1986

Board of Trustees
City of Minneapolis Police Relief Association
Minneapolis, Minnesota

<u>Submitted in this report</u> are the results of the December 31, 1985 actuarial valuation of the assets, actuarial values and contribution requirements associated with the benefits provided by the Minneapolis Police Department Relief Association.

<u>The valuation results</u> contained in Section A provide the actuarial information needed to determine the employer's "minimum obligation" effective January 1, 1987. Section A also contains <u>comments</u> regarding the valuation results.
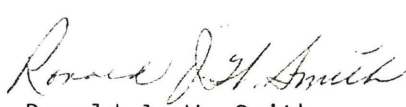
<u>The valuation was based upon information furnished by the association</u> concerning benefits, financial transactions, active members, terminated members, retirants and beneficiaries. Data was checked for year to year consistency but was not otherwise audited by us. This information is summarized in Section B.
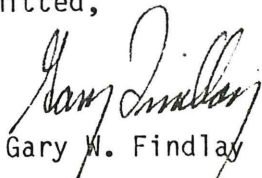
Section C contains a description of the <u>actuarial funding method</u> and the risk experience assumptions used. The economic risk experience assumptions, as well as the actuarial funding method to be used, are established by state law.

Information needed to comply with Statement of Financial Accounting Standards No. 35 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,

Ronald J. W. Smith   Gary N. Findlay

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SECTION A

RESULTS OF THE VALUATION

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COMMENTS

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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 (for example, it is currently not valid to compare valuation results for a plan having full escalation to valuation results for a plan having a 3-1/2% cap on escalation). 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.

Change in Assumptions

The results presented in this report reflect a change in the assumed retirement age from 55 to 54. This change was predicated on the following characteristics of the present active group and key plan provisions:

1. The anticipated average age upon reaching 25 years of service is 51.

2. The percent of the group anticipated to have 25 or more years of service upon reaching the age of 54 is 84%.

3. The benefit accrual and member contribution provisions of the plan provide a disincentive for continuation in service beyond the 25th year.

This assumption change is further supported by a review of actual plan experience which indicates a trend toward earlier retirement. Our general experience with police plans suggests an average continuation in service beyond eligibility of 2 years. This change increased the normal cost rate by 1.59% of payroll and increased the amortization payment by $504,151. The increase in the unfunded accrued liability due to this assumption change was $7,129,100.

The increase in computed contributions resulting from this change was substantially offset by the very favorable investment experience of the Association during 1985.

Minneapolis Police Relief Association

CONTRIBUTION RATE TO PROVIDE BENEFITS

Member portion & Employer portion

Effective January 1, 1987

Contributions for	If Paid Equally Throughout Year		
	Normal Cost % of Active Payroll for 1987	+	UAAL Dollars
Normal cost of annuities:			
Age & service: to members	22.33%		
Age & service: to survivors	3.62		
Disability	2.06		
Death before retirement	1.65		
Refunds of member contributions	0.00		
Total Normal Cost	29.66%		
Amortization of unfunded actuarial accrued liabilities (UAAL) (24 year level dollar payment)			
Total			$10,545,734
Total Cost of Benefits	29.66%	+	$10,545,734
Member contributions	8.00		
COMPUTED EMPLOYER RATE:			
(a) If Paid Equally Throughout Year	21.66%	+	$10,545,734
(b) If Paid As Outlined Below	21.91%	+	$10,665,955

The amounts in (b) were computed to adjust for interest according to the following payment pattern:

1. The state amortization aid of $1,776,600 is received in 4 equal installments on 3/15, 7/15, 9/15 and 11/15.

2. The balance of the contribution is received as follows:

   a. 16.0% of the balance is received from the State on 10/15.
   b. 35.1% of the balance is received from the City on 7/5 and 12/5.
   c. 2.3% of the balance is received from the City on 7/15, 8/15, 9/15, 10/15, 11/15 and 12/15.

Minneapolis Police Relief Association

Present Actuarial Condition

The Association's accrued actuarial assets were in excess of $115 million on December 31, 1985 -- a considerable sum of money if unencumbered and allocated among a small group of persons. This is not the case with the Association's assets.

The following schedule puts the $115 million into perspective by showing the relationship between accrued actuarial assets, actuarial accrued liabilities, and the number of persons with actual and potential claims on the Association's assets.

	Accrued Actuarial Assets	Actuarial Accrued Liabilities	Unfunded Actuarial Accrued Liabilities	% Funded
Retirants and Beneficiaries				
Retired Members (450)		$110,150,988		
Surviving Spouses (223)		18,960,132		
Surviving Children (26)		371,328		
Total (699)		$129,482,448		
Deferred Members (9)		2,811,984		
Active Members (611)		131,899,592		
Total	$115,068,881	$264,194,024	$149,125,143	43.6%

Actuarial accrued liabilities represent the value, computed as of December 31, 1985 of:

(i)   retirement allowances likely to be paid the 699 retirants and beneficiaries; and

(ii) the contributions assumed to have been made for the 611 active members from their entry into the plan until December 31, 1985.

To illustrate, the value of retirement allowances likely to be paid the 699 retirants and beneficiaries, discounted for investment earnings and mortality, was computed to be $129,482,448 as of December 31, 1985. This means that if the 699 retirants and beneficiaries live and die according to the assumed mortality and if the $129,482,448 can be invested to yield an average annual return of 5.0 percent over the remaining lifetimes of the 699 retirants and beneficiaries, then the $129,482,448 together with investment earnings thereon will just be sufficient to pay the 699 retirants and beneficiaries their allowances for their remaining lifetimes.

With respect to active members, the actuarial accrued liability of $131,899,592 represents the amount that would have been accumulated by December 31, 1985 if the normal cost (which is expressed as a level percentage of pay) had been contributed from the date of hire until December 31, 1985 for each of the 611 actives, if these amounts had earned 5.0% interest and if the members in the past had lived, died, withdrawn, retired and received salary increases according to the actuarial assumptions shown in this report.

Historical Funding Ratio Schedule
($ in thousands)

Valuation Date December 31	Actuarial Accrued Liabilities	Accrued Actuarial Assets	Percent Funded
1978	$143,363	$ 25,317	17.7%
1979	163,665	29,846	18.2
1980	179,399	37,980	21.2
1981	200,493	46,721	23.3
1982*	228,109	65,379	28.7
1983	232,890	81,382	34.9
1984*	248,239	94,680	38.1
1985	257,065	115,069	44.8
1985*	264,194	115,069	43.6

* Revised actuarial assumptions.

Minneapolis Police Relief Association

Computed Contributions - Comparative Schedule

Year Ended December 31 Valuation	Fiscal	Total Normal Cost as a Percent of Valuation Payroll*	Contribution For Unfunded Actuarial Accrued Liabilities - $ or %
1978	1980	21.12%	$ 5,760,080
1979	1981	23.75	8,494,852
1980	1982	24.64	9,114,128
1981	1983	24.79	10,071,771
1982	1984**	27.40	10,844,206
1983	1985	27.27	10,284,548
1984	1986**	28.74	10,631,760
1985	1987	28.07	10,041,583
1985	1987**	29.66	10,545,734

*   Includes employee contributions.

** Revised actuarial assumptions.

Minneapolis Police Relief Association

CONTRIBUTION FOR CALENDAR YEAR EFFECTIVE JANUARY 1, 1987

For any period of time the percent-of-payroll contribution rate is converted to dollars. The amount of dollars for any calendar year depends upon the results of the last actuarial valuation, and upon the timing of contributions within the year. The later the contribution date, the greater the dollar amount will be.

The municipality's dollar contribution for the year may be determined as follows:

(1) Estimated covered payroll for 1987 $_____

(2) Total normal cost % from page A-2   29.66%

(3) Total normal cost (Line 1 times line 2) $_____

(4) Amortization payment on UAAL from page A-2   10,545,734

(5) Total contributions required (Line 3 plus line 4)   _____

(6) Employee contributions (Line 1 times 8%) $_____

(7) (a) State amortization aid based on
          12/31/78 UAAL of $118,046,510 $1,776,600
      (b) State amortization aid based on
          1984 legislation   243,620
      (c) Total state amortization aid   2,020,220

(8) Estimated insurance premium aid   _____

(9) Estimated total contributions from
      other sources (Line 6 plus line 7 plus line 8)   _____

(10) Employer's Minimum Obligation if payment is made
     in equal installments throughout the year.
     (Line 5 minus line 9) $_____

(11) EMPLOYER'S MINIMUM OBLIGATION IF PAYMENT IS MADE
     AT YEAR END (Line 10 times 1.0114) $_____

SECTION B

VALUATION DATA

AND

SUMMARY OF BENEFIT PROVISIONS

Minneapolis Police Relief Association

Retirants and Beneficiaries December 31, 1985

By Type of Annuity Being Paid

Type of Annuity Being Paid	No.	Monthly Amounts	Computed Actuarial Accrued Liabilities
Retirants receiving:			
Age & Service	437	$589,279.47	$105,237,336
Disability	13	15,708.42	4,913,652
Totals	450	604,987.89	110,150,988
Beneficiaries receiving:			
Spouse	223	150,921.94	18,960,132
Child	26	5,414.24	371,328
Totals	249	156,336.18	19,331,460
Totals	699	$761,324.07	$129,482,448

Inactive Members Eligible for Deferred Benefits

December 31, 1985

No.	Monthly Amount	Computed Actuarial Accrued Liabilities
9	$11,184.68	$2,811,984

Minneapolis Police Relief Association

Retirants and Beneficiaries December 31, 1985

By Attained Ages

Attained Ages	Number		
	Age & Service	Disability	Death Before Retirement
Under 20	2	2	22
20-24			1
30-34			2
35-39		2	
40-44		5	2
45-49	1	5	2
50-54	39	1	3
55-59	83		4
60-64	99		7
65-69	118		7
70-74	121		2
75-79	70		4
80-84	42		3
85-89	33	1	2
90-94	9		
95-99	4		
100 & Over	1	—	—
Totals	622	16	61

Minneapolis 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 No.	Rolls End of Year Annual Allowances	% Incr. in Annual Allowances	Average Allowances	Discounted Value of Allowances Total	Discounted Value of Allowances Average
1978			717	$5,544,391	%	$ 7,733	$ 82,727,290	$115,380
1979	N/A	N/A	731	6,007,316	8.3	8,218	88,184,433	120,635
1980	29	72	688	6,214,153	3.4	9,032	94,396,604	137,204
1981	59	90	695	7,415,469	19.3	10,670	100,936,794	145,233
1982	30	29	696	7,616,484	2.7	10,943	117,978,790	169,510
1983	36	40	692	8,238,879	8.2	11,906	119,499,721	172,687
1984	35	35	692	8,630,848	4.8	12,472	122,412,264	176,896
1985	36	29	699	9,135,889	5.9	13,070	129,482,448	185,240

Minneapolis Police Relief Association

Active Members December 31, 1985

By Attained Age and Years of Service

| 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
30-34		7	19					26	$ 888,966
35-39		18	80	47				145	4,957,695
40-44		4	38	112	3			157	5,367,987
45-49			9	55	81			145	4,957,695
50-54			3	9	56	13	1	82	2,803,662
55-59				5	10	15	8	38	1,299,258
60					2	1	6	9	307,719
61						1	2	3	102,573
62					1		1	2	68,382
65							3	3	102,573
69							1	1	34,191
Totals		29	149	228	153	30	22	611	$20,890,701

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

Age: 44.5 years.

Service: 18.5 years.

Annual Pay: $34,191.

Minneapolis Police Relief Association

Comparative Schedule

Of Active Members

Valuation Date December 31	Active Members	Valuation Payroll	Average			
			Age	Service	Pay	% Incr.
1978	811	$18,394,210	40.3 yrs.	13.7 yrs.	$22,681	- %
1979	771	18,661,284	40.7	14.4	24,204	6.7
1980	737	19,350,672	41.4	15.1	26,257	8.5
1981	712	20,218,664	41.9	15.5	28,397	8.2
1982	686	20,474,356	42.5	16.2	29,846	5.1
1983	663	20,979,972	43.2	17.0	31,644	6.0
1984	641	21,079,926	43.9	17.8	32,886	3.9
1985	611	20,890,701	44.5	18.5	34,191	4.0

Minneapolis Police Relief Association

Brief Summary (12/31/85) 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. For first 20 years of service, 34/80 of base pay. For service in excess of 20 years, an additional 1/80 is provided for each of the first 4 years and 4/80 is added for the 25th year to a maximum of 42/80 of base pay for 25 or more years of service. (Members retired prior to 7/80 receive 1/80 of base pay less and those retired prior to 7/69 receive 1/80 of base pay for each year over 20 thru the 28th year.)

Pay Used For Plan Purposes. "Base pay" means the salary of a top grade patrol officer.

Disability Retirement

Eligibility.

Non-duty. No minimum required.

Duty. No minimum service required. (In either case, disabled to the extent that no longer able to perform duties of a police officer including limited duty.)

Amount.

Non-duty. 34/80 of base pay. (Prior to 7/80 non-duty disability benefits ranged from 13/80 to 33/80.)

Duty. 34/80 of base pay. (Prior to 7/80 the amount was 33/80.)

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

Eligibility.

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

Child. Younger than age 18 or, if in school, younger than age 22.

Amount.

Spouse. 19/80 of base pay.

Child. 6/80 of base pay per child. Children's maximum is 14/80 if spouse is receiving or 32/80 if no spouse is receiving.

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 base pay is changed, payments to all benefit recipients are simultaneously changed by the same percent that base pay is changed.

Member Contributions. 8% of base pay. Member contributions are non-refundable. If a member terminates after 5 years of service but before being eligible for an immediate or deferred benefit, a lump sum refund of $500 plus $100 for each full year over 5 is paid.

SECTION C
VALUATION METHODS AND ASSUMPTIONS

Minneapolis Police Relief Association
Valuation Methods and Assumptions

The Entry Age Normal Cost method was used to determine the normal cost of all bene-
fits.

The rate of investment return (interest) used in making the valuation was 5.0 per-
cent per annum, compounded annually. State law requires use of this assumption.

The mortality table used was the UP-1984 Table set forward 2 years for males and set
back 3 years for females.

Single Life Values:
Present Value of $1 Monthly

Sample Ages	Level For Life		Increasing 3.5% Yearly		Future Life Expectancy (Years)	
	Men	Women	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

Age & service retirement was assumed to occur at age 54, or attained age if older.

Sample Rates of Separation from Active Employment Before Retirement, Death or Disa-
bility

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

Sample Ages	Present Pay Resulting in Pay of $1,000 at Age 60	Percent Increase in Pay During Next Year
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.

Disability retirements were assumed to occur as indicated below:

Sample Ages	% of Active Members Becoming Disabled within Next Year
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

ACCUMULATED PLAN BENEFITS

Minneapolis Police Relief Association

Statement of the Present Value of Accumulated Plan Benefits

December 31, 1985

Actuarial Present Value of
Accumulated Plan Benefits

Vested Benefits:
Participants currently receiving payments $128,315,112
Other participants   53,224,792
Total Vested Benefits   181,539,904

Non-Vested Benefits   39,349,112

Total Actuarial Present Value
of Accumulated Plan Benefits $220,889,016

The actuarial present value of accumulated plan benefits as of January 1, 1985, was $204,307,215. During the year, the plan experienced a net increase of $16,581,801 in the actuarial present value of accumulated plan benefits.

The net change for the year was attributable to an increase of $10,026,161 due to general plan experience and an increase of $6,555,640 due to a change in assumptions.

The accompanying notes are an integral part of the Statement of the Present Value of Accumulated Plan Benefits.

1. The actuarial present value of accumulated plan benefits presented in this statement was determined using the following assumptions:

    a. Future salary increases prior to retirement were not considered for active members.

    b. Future service was considered only to the extent that it would permit active plan participants to become eligible for benefits attributable to service rendered prior to the date of determination.

    c. Regular valuation assumptions were used as to mortality, withdrawal, retirement ages and disability.

    d. Investment return was assumed to be at the rate of 8% compounded annually.

    e. Salary increase related post retirement benefit adjustments were assumed to be at the rate of 6-1/2% compounded annually unless a lower rate is specified by law.

2. The calculation of the actuarial present value of accumulated plan benefits was made because of the requirements of the Financial Accounting Standards Board. Comparison of this value with plan assets is not indicative of the future ability of the plan to pay benefits when due or of their security in a termination situation.

    Calculation of contribution requirements and related benefit value information in a "going concern" environment according to the principles of level cost financing is made by the annual actuarial valuations. The results of the contribution rate calculations cannot be simply replaced by the accumulated plan benefit results. To do so will mislead.

APPENDICES

FINANCIAL PRINCIPLES AND OPERATIONAL TECHNIQUES

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

$

ACTIVE

CASH BENEFITS PAID

PAYS COVERED

**PLAN CLOSED
TO NEW HIRES**

40±

100±

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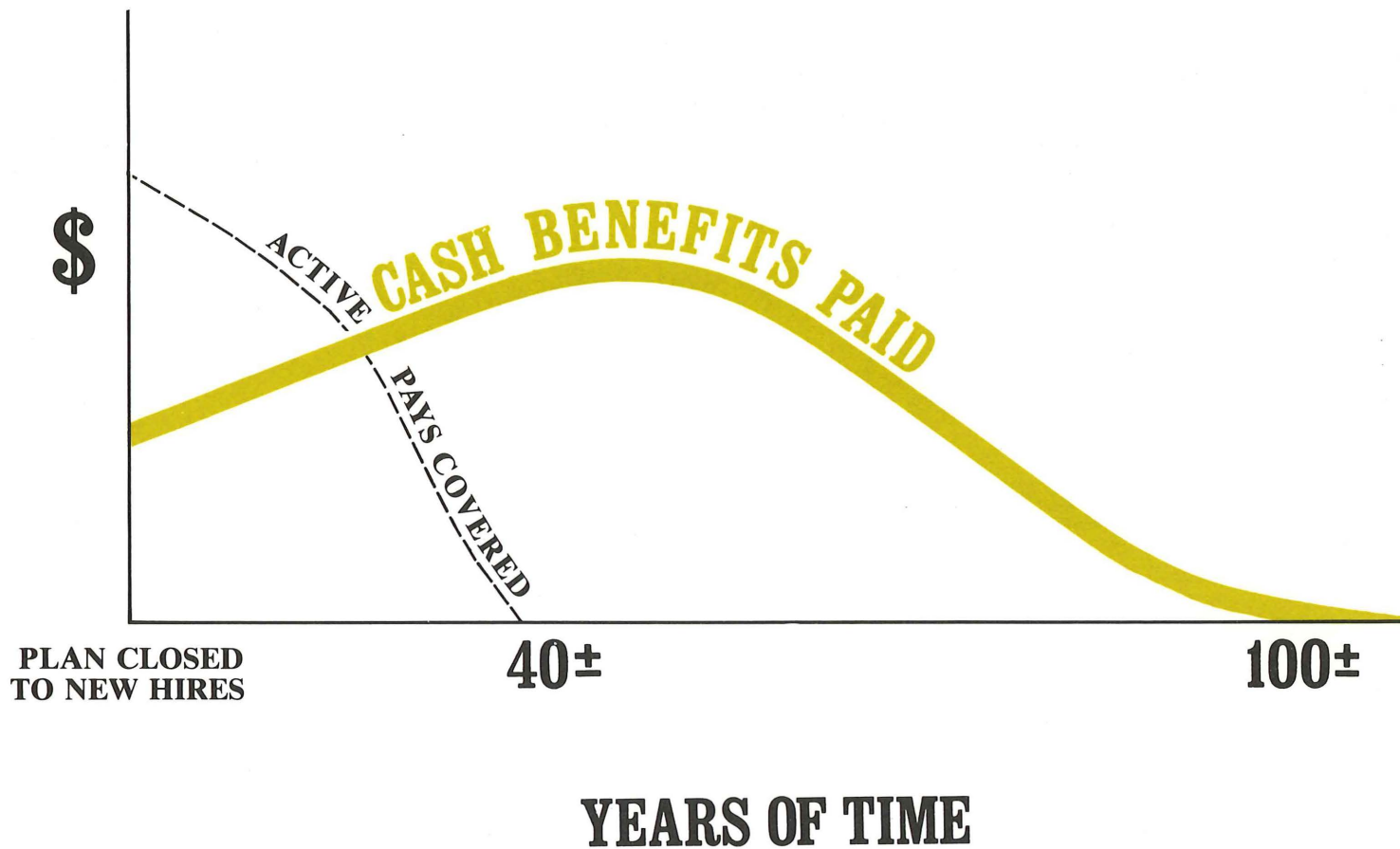
A plan becomes closed when no new hires are admitted to active membership. The persons covered by the plan at the time of closing continue their normal activities and continue to be covered by the plan, until the last survivor dies.

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.

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.