

ACTUARIAL REPORT
EMPLOYEES' RETIREMENT ASSOCIATION
of the
COUNTY OF FRESNO

Made to the Board of Retirement
As of June 30, 1945

COATES & HERFURTH
CONSULTING ACTUARIES

SAN FRANCISCO

LOS ANGELES

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January 31, 1946

Board of Retirement
Fresno County Employees' Retirement Association
Fresno, California

Gentlemen:

In accordance with our agreement, we have made an actuarial valuation of the Fresno County Employees' Retirement Association as provided in Section 58 of the County Employees' Retirement Act of 1937, and hand you our report herewith.

We desire to express our appreciation of the co-operation extended to us by the members of the Board and the Office of the Association.

Respectfully submitted,

COATES AND HERFURTH,
Consulting Actuaries

By Arthur W. England
Arthur W. England

AWE:bjb

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ACTUARIAL REPORT
FRESNO COUNTY EMPLOYEES' RETIREMENT ASSOCIATION
as of June 30, 1945

Section 58 of the County Employees' Retirement Act of 1937 (referred to herein as the Act) provides as follows:

An actuarial valuation shall be made within the period of one year from the date on which any system established under this Act becomes effective, and thereafter at not to exceed five year intervals. The investigation shall be conducted under the supervision of an actuary and shall cover the mortality, service and compensation experience of the members and beneficiaries, and shall evaluate the assets and liabilities of the retirement fund created. Upon the basis of any or all of such determination, investigation and valuation, and upon the recommendation of the actuary, the board of retirement shall recommend to the board of supervisors such changes in rate of interest, in the rates of contributions of members as well as such changes in county and district appropriations as may be deemed necessary. No adjustment shall be included in the new rates for time prior to the effective date of such revision.

The Retirement Association was established effective January 1, 1945. The present valuation was made as of June 30, 1945, pursuant to Section 58 and other terms of the Act, based on personnel statistics furnished us by the Retirement Office and the Accounting Balance Sheet of the System as of the same date.

The Act sets forth in detail initial normal rates of contributions of members as well as the contribution rates for the County, and establishes $3\frac{1}{2}\%$ as the initial interest rate. Since the contribution rates set forth in the Act for the members and

the County were not specifically calculated on an assumption as to interest and other contingencies appropriate to any particular future date or individual county, it is necessary that they be adjusted before their application results in any appreciable deficiency.

The first objective of the valuation is to calculate the rates of contribution by members which are necessary to accomplish the purpose set forth in the Act. The second objective of the valuation is to ascertain the liabilities which have been assumed by the County in adopting the 1937 Act, and determine to what extent these liabilities are covered by the contributions of the employees. The liabilities not covered by the employees' contributions are to be paid by contributions from the County in a manner outlined in the Act and to be recommended by the Actuary.

In order to calculate the new rates of contribution to be paid by members it is necessary to make some assumption in regard to the following elements which are the basis for these rates.

1. Probable net interest rate to be earned on funds of the Association in the future.
2. The relative salaries to be earned by members at various ages during their service period.
3. The probable mortality to be experienced among members who will retire for service under the Act.

In order to calculate the liabilities assumed by the County and from these determine the contributions to be made, it was

necessary to adopt other assumptions as to the probability and rate of occurrence of the following additional contingencies:

1. Withdrawal from service before retirement
2. Retirement for disability
3. Retirement for service
4. Mortality before retirement
5. Mortality after retirement for disability

Statistics Furnished

In order to aid in the adoption of the various necessary assumptions, the Office of the Association furnished us, on a form suggested by us, the following information on all members of the Association as of June 30, 1945.

Name

Department

Occupation

Sex

Date of Birth

Age of membership

Rate of contributions (as shown in the Act)

Date of employment

Prior Service salary

Present monthly salary

Accumulated contributions as of June 30, 1945.

In addition to the above information we were also furnished with similar material on all members whose membership had terminated in the preceding nine months.

It is obvious that the operation of the System over a period of six months, even in normal times, does not furnish information sufficiently reliable to justify making our assumptions on this experience alone. It was therefore necessary to consider the experience of other municipal retirement systems with comparable benefits and where adequate data under normal operating conditions was available upon which assumptions could be based as to rates of discontinuance and mortality.

Rate of Interest

Most of the municipal retirement systems in this State are operating on an interest assumption in the neighborhood of $2\frac{1}{2}\%$. The few which are using an assumption greater than this rate are those which have large funds on hand, which were invested in the past at higher rates of interest which were then current. Their current investments, however, are being made at approximately a $2\frac{1}{2}\%$ yield.

Since there seems to be little likelihood that the net yield on your assets over the next few years can exceed $2\frac{1}{2}\%$, and inasmuch as we know of no definite indication that the yield will fall substantially below that figure in the near future, we have assumed in all our calculations that interest will be earned at the rate of $2\frac{1}{2}\%$ compounded annually.

Salary Scale

The census cards furnished us by the Association were tabulated by age, and the average salary for each age was

determined. Separate salary scales were then constructed for men and for women based on this actual experience. Through the use of these scales the fundamental assumption is made that, on the average, salaries of present members will change in the proportions indicated as their ages increase. The actual salary scales are shown in Schedule 3.

Since the amount of annuity payable to a member is governed solely by the amount which he contributes with interest accruals, any variation in individual experience, as compared with the salary scale, will neither prejudice the interest of the member nor impair the stability of the System. For convenience in calculation the anticipated salary at the oldest ages is shown as unity, and the corresponding salary at each younger age is shown as a ratio.

Withdrawal from Service before Retirement

It is quite obvious that any assumption as to turnover of employment which was based upon the results of the last few years would be of a very questionable value if of any value at all. The withdrawal rates which are shown in Schedules 5 and 6, were based upon San Francisco experience prior to the war period. When the next actuarial valuation is made these rates will be then investigated, and changed if necessary in the light of your actual experience.

Mortality before Retirement

The mortality rates which were adopted for this valuation,

and which appear in Schedules 5 and 6, were based upon the experience of the Los Angeles County System in the five years immediately preceding the last valuation of that system. These rates should prove reliable for the purpose they are intended, since the benefit under that system is identical with yours. Rates developed from a system which gives no additional benefit upon death over that given in the event of withdrawal from service would be unreliable. In such a system many deaths are actually reported as withdrawals since there is no reason to record the fact that death followed almost immediately upon severance of employment.

Retirement for Disability

The disability rates adopted for this valuation are shown in Schedules 5 and 6. The disability rate, more than any other rate necessary in the valuation, is difficult to predict. Obviously the number of members who will be allowed retirement on disability will be governed entirely by the action taken on the individual cases by the Retirement Board. If the Board is lenient in the determination of what constitutes disability, the disability rate will be high. If, on the other hand, the Board is more stringent in measuring this condition, the rate will be low. The cost of the benefits to the County will therefore vary primarily with the administration of the benefit. The rates adopted were selected from our file on a "judgment" basis.

Retirement for Service

The rates of retirement for service which were adopted for the valuation are shown in Schedules 5 and 6. Since the retirement provisions of the law do not become operative without restrictions until two years have passed, these rates were selected from experience under older systems where the period during which restriction was in effect has passed.

Mortality after Retirement for Disability

This rate will vary materially with the individual system. Systems which are very strict in their appraisal of disability cases may have extremely high rates of mortality among their disabled members, whereas those systems which are lenient may have almost normal mortality among such retired members. The Act contemplates that persons retired for disability are permanently incapacitated for the performance of duty, and for this reason the death rate among such disabled members should be higher than would occur in a normal group. As a measure of the mortality after retirement for disability, we have adopted a table which has been borne out by the experience among disabled employees in the State of California Employees' Retirement System. This is probably the largest group of such cases under a comparable system anywhere in the West on which material is available. The rates which were adopted are shown in Schedule 10.

Mortality after Retirement for Service

Considerable material is available as to the experience

among members retired for service under municipal retirement systems. We have just completed a study covering the experience over a period of fifteen years of a group of such retired members numbering approximately 1,000. After a number of rates were tested on this particular group it was found that the rate which most closely fitted the experience was the Combined Annuity Table. We have adopted this rate as a measure of the mortality after retirement for service for your valuation. The rates as shown by this table appear in Schedule 9.

Normal Rates of Contribution of Members

Section 59 of the Act provides that the normal rates of contribution of members shall be based on sex and age at nearest birthday at the time of entrance into the Retirement System. It further provides that these rates shall be such as will provide, on the average, an annuity at age 65 equal to $1/140$ of the final compensation of members, according to the tables adopted by the Board, for each year of service rendered after entering the System. We have calculated the rates which we believe to be applicable based on $2\frac{1}{2}\%$ interest, the Combined Annuity Table of Mortality, and the salary scale mentioned earlier in this report. These rates of contribution for men and women are shown in Schedule 4.

Balance Sheet

Having calculated the normal contribution rates of members, and having adopted the various rates measuring future contingencies as they affect members of the System, we constructed service

tables to serve as a foundation for all financial calculations in connection with an actuarial balance sheet of the Association. Separate service tables were made for men and women, and upon the basis of these tables and an interest assumption of $2\frac{1}{2}\%$, the liabilities under the System were calculated, and the following Balance Sheet prepared.

ACCOUNTING BALANCE SHEET

June 30, 1945

ASSETS

1.	Cash on hand	\$18,300.85	
2.	Investments	36,000.00	
3.	Accrued Interest	41.62	
4.	Total Assets		\$54,342.47

LIABILITIES

5.	Members Deposit Reserve	\$31,113.17	
6.	County Advance Reserve	14,801.31	
7.	Annuity Reserve	24.10	
8.	Pension Reserve	24.10	
9.	Prior Service Reserve	8,379.79	
10.	Total Liabilities		\$54,342.47

ACTUARIAL BALANCE SHEET

Actuarial Valuation of Assets and Liabilities
of Retirement System as of June 30, 1945

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ASSETS

1. Cash on hand		\$ 18,300.85
2. Securities owned		38,000.00
3. Accrued Interest		41.62
4. Future Contributions from employees		1,077,786.00
5. Future Contributions from County for		
(a) Current Service Pensions	\$804,677.30	
(b) Death Benefit	103,681.00	
(c) Prior Service Pensions	<u>785,451.21</u>	<u>1,693,809.51</u>
6. Total Assets		<u>\$2,825,937.98</u>

LIABILITIES

7. Disability and Service Allowances already granted		\$ 8,246.00
8. Service Retirement Allowances to be paid to present members		
(a) Members Annuities	\$676,164.65	
(b) Current Service Pension	676,164.65	
(c) Prior Service Pensions	609,438.00	
(d) Extra a/c minimum provisions	<u>27,980.00</u>	1,989,747.30
9. Disability Retirement Allowances to be paid present members		
(a) Members Annuities	\$145,762.84	
(b) Current Service Pensions	143,310.16	
(c) Prior Service Pensions	<u>148,219.00</u>	437,292.00
10. Death Benefits to be paid present members		
(a) Refund to members' Contributions	\$210,657.09	
(b) Salary Benefit	<u>103,681.00</u>	314,338.09
11. Withdrawal Benefits to be paid to present members		<u>76,314.59</u>
12. Total Liabilities		<u>\$2,825,937.98</u>

Comments on Actuarial Balance Sheet

The first three items on the asset side of the actuarial balance sheet are taken directly from the accounting balance sheet of the System, as furnished us by the Retirement Office and represent the physical assets on hand June 30, 1945. These items are the result of the net contributions made by members and the County prior to that date, together with any interest earnings realized. We have made no check or audit of these physical assets. Item 4 represents the present value of all future contributions to be made by present members while they are members of this Association, at the rates shown in Schedule 4. Item 5 represents the present value of all future contributions which are to be made by the County on behalf of present members of the Association. On the basis of rates and tables adopted and already discussed, this amount is calculated to be sufficient when added to present assets and members' future contributions, to provide all the benefits set forth in the Act.

Items appearing on the liability side of the balance sheet set forth the present values as of June 30, 1945, of amounts expected to become payable under each of the benefits provided in the law on that date. Item 7 represents the liability on account of one service retirement allowance in effect on the valuation date. Items 8, 9, 10 and 11 represent the calculated present value of benefits which will be paid to members of the System who eventually retire for service, retire for disability,

die while in service or withdraw from service.

County Contributions

County contributions shown in the actuarial balance sheet (Item 5) are the present value of all future contributions to be made on behalf of present members, and these figures must be transformed into current annual payments in order to determine the actual appropriations required from County funds. The Act (Article 6) states that County contributions are divided into three categories: (1) a contribution sufficient to cover service and disability pensions accruing against the County because of service currently rendered; (2) a contribution equal to current requirements for death benefits (exclusive of return of member contributions); (3) a contribution on account of prior service liability. Each of these three items will be discussed briefly.

Item 5a of the actuarial balance sheet shows that the present value of all pensions for service and disability due to service after the installation of the System is \$804,677.30. Assuming that the salaries of members will progress approximately in accordance with the salary scales already discussed, and making discounts for mortality, withdrawal, etc., and allowing for interest at $2\frac{1}{2}\%$, we find that the present value of future salaries to be received by present members is approximately \$17,925,874.00. From this it follows, therefore, that in order to cover the liability for pension for the current service, we require a contribution from the County equal to 4.49% of payroll.

This is the rate referred to under the first item in Article 6 of the Act.

There is no death benefit under the Act until a member has served at least one full year under the System. If death occurs before retirement and after at least one year of service under the System, the member's beneficiary receives one month's salary for each completed year of service, but in no event, more than six months' salary. The Act requires that County contributions to cover this benefit shall be on a current cash basis rather than on a "reserve" basis. The necessary contribution to be made by the County was calculated by applying the anticipated death rate at various ages to the present membership and we find that the contribution necessary from the County to cover this benefit until the next valuation expressed as a percentage of compensation of members would be as follows: .09% for the first year, .18% for the second year, .27% for the third year; .36% for the fourth year and .45% for the fifth year.

The Act does not specify the exact manner in which "prior service" benefits shall be financed. The calculated present values of such benefits are shown in Item 5c of the Actuarial balance sheet and amount to \$785,451.21. In the first few years of the System cash requirements will be small, since few members will have retired, but in order to avoid continual increases in required contributions in future years, we believe that a definite amortization of this liability for prior service should be inaugurated. The most conservative method of financing would

be to accumulate the total amount required as to each individual by the time that individual retires, but this would involve a very heavy investment of County funds and seems unnecessarily drastic. It appears to us, however, to be essential that the prior service obligation be paid off during the approximate lifetime of the present members. We believe that a reasonable period over which this liability could be amortized would be thirty years, but the choice of the exact period should rest with the Retirement Board. We are therefore showing below the annual payment and the corresponding percentage of present payroll that it represents for amortization periods of 25, 30, 35, and 40 years.

Period	Annual Payment	Percentage of Payroll
25	\$42,631	2.90%
30	37,527	2.55
35	33,956	2.31
40	31,289	2.13

Recommendations

Upon the basis of our valuation and as provided for in Section 58 of the Retirement Act, we conclude our report with the following recommendations:

1. Interest Rate: We recommend that for the calculation of employees' contributions and the conversion of these contributions into annuities upon retirement, interest be assumed at the rate of $2\frac{1}{2}\%$ compounded annually. We also suggest that the interest on the individual employee accounts and on all interest-bearing accounts

representing County contributions be credited at a rate which does not exceed the earnings of these funds.

2. Mortality Standards: We recommend that for the calculation of service retirement allowances the mortality assumption used be that shown by the Combined Annuity Table. We also recommend that for the calculation of the liabilities arising from disability retirement allowances the mortality assumption be that shown by the 1943 Disability Table. We further recommend that when an option is selected by a member which involves the life of a second party, such as occurs if Option 2, 3 or 4 is chosen, the mortality standard to be used for this second party be the Combined Annuity Table with the age set back one year.

3. Normal Rates of Contributions of Members: We recommend that until these are changed as provided for in the Retirement Act the normal rates of contributions of members shall be those shown in Schedule 4.

4. County Contributions: We recommend that until the next complete or limited investigation the County appropriate and transfer, instead of the amount set forth in Sections 100 and 101, the following contributions:

- a. For service and disability pensions, on account of current service, 4.49% of the total compensation of members in the Retirement Association.

- b. For death benefit, the following percentages of the total compensation of members: .09% for the first year, .18% for the second year, .27% for the third year, .36% for the fourth year, and .45% for the fifth year.
- c. For prior service, \$37,527.00 per annum which is calculated to amortize the prior service liability in thirty years, and which is equivalent as of June 30, 1945, to a contribution of 2.55% of compensation of members.

5. We recommend that until the next complete or limited investigation the total contributions made by the County be applied to meet the County's obligations under the System in the order and amounts as follows and as provided for in the Act:

- a. 4.49% of the total compensation on which the County's contribution is based, on account of the liability accruing because of current service;
- b. An amount equal during each fiscal year to the payments made during that year for benefits set forth in Article 10 (death benefit);

- c. The balance of County contributions
to be applied on account of liabilities
accruing for prior service benefits.

Respectfully submitted,

COATES AND HERFURTH,
Consulting Actuaries

By Arthur W. England
Arthur W. England

AWE:bjb

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SCHEDULE 1

Number of Members and Total Monthly Salaries

By Sex and Attained Age

<u>Attained Age</u>	<u>MALE</u>		<u>FEMALE</u>		<u>TOTAL</u>	
	<u>No.</u>	<u>Salary</u>	<u>No.</u>	<u>Salary</u>	<u>No.</u>	<u>Salary</u>
20			18	2,433.88	18	2,433.88
21	1	\$ 190.00	7	995.00	8	1,185.00
22			9	1,230.00	9	1,230.00
23			5	795.00	5	795.00
24			15	2,420.00	15	2,420.00
25			9	1,482.00	9	1,482.00
26	2	390.00	10	1,533.75	12	1,923.75
27	1	200.00	8	1,405.00	9	1,605.00
28	4	844.75	7	1,150.63	11	1,995.38
29	1	170.00	7	1,182.00	8	1,352.00
30	2	385.00	6	1,072.00	8	1,457.00
31	1	170.00	9	1,455.00	10	1,625.00
32	1	233.98	9	1,480.00	10	1,713.98
33	4	728.20	9	1,515.00	13	2,243.20
34	4	824.25	7	1,220.00	11	2,044.25
35	11	2,143.98	15	2,542.00	26	4,685.98
36	3	745.00	6	930.00	9	1,675.00
37	9	1,856.66	15	2,402.00	24	4,258.66
38	6	1,149.25	8	1,280.00	14	2,429.25
39	4	819.40	11	1,795.00	15	2,614.40
40	5	1,495.85	6	982.50	11	2,478.35
41	8	1,619.69	10	1,710.00	18	3,329.69
42	4	1,104.75	10	1,690.00	14	2,794.75
43	10	2,090.33	14	2,352.50	24	4,442.83
44	8	1,879.02	15	2,605.00	23	4,484.02
45	7	1,484.50	8	1,325.00	15	2,809.50
46	3	654.75	10	1,700.00	13	2,354.75
47	9	1,944.66	13	2,010.00	22	3,954.66
48	10	2,484.38	12	2,077.00	22	4,561.38
49	15	3,057.27	10	1,800.00	25	4,857.27

(Continued on next page)

SCHEDULE 1

Number of Members and Total Monthly Salaries

By Sex and Attained Age

(Continued)

<u>Attained Age</u>	<u>MALE</u>		<u>FEMALE</u>		<u>TOTAL</u>	
	<u>No.</u>	<u>Salary</u>	<u>No.</u>	<u>Salary</u>	<u>No.</u>	<u>Salary</u>
50	12	\$ 2,552.13	8	\$ 1,285.00	20	\$ 3,837.13
51	11	2,133.68	13	2,492.00	24	4,625.68
52	11	2,129.37	6	830.00	17	2,959.37
53	14	2,932.10	13	2,057.50	27	4,989.60
54	12	2,546.39	10	1,480.00	22	4,026.39
55	10	1,791.38	6	935.00	16	2,726.38
56	6	1,172.25	7	1,190.00	13	2,362.25
57	6	1,329.75	7	1,305.00	13	2,634.75
58	6	1,326.00	3	510.00	9	1,836.00
59	4	795.00	6	1,030.00	10	1,825.00
60	3	715.90	4	690.00	7	1,405.90
61	7	1,889.25	4	685.00	11	2,574.25
62	5	1,051.45	5	925.00	10	1,976.45
63	6	1,269.85			6	1,269.85
64	2	453.38	2	375.00	4	828.38
65	4	825.00	5	900.00	9	1,725.00
66	3	705.00	2	335.00	5	1,040.00
67	3	636.21			3	636.21
68	1	201.75	3	520.00	4	721.75
69	1	273.00			1	273.00
70	1	165.00	2	528.00	3	693.00
71						
72	1	190.00			1	190.00
73						
74						
75						
76						
77						
78						
79						
80	<u>1</u>	<u>225.00</u>	<u>1</u>	<u>225.00</u>	<u>2</u>	<u>450.00</u>
	263	\$55,974.51	404	\$66,642.76	667	\$122,617.27

SCHEDULE 2

Number of Members and Total Monthly Salaries
by Sex and Years of Prior Service

<u>Years</u>	<u>MALE</u>		<u>FEMALE</u>		<u>TOTAL</u>	
	<u>No.</u>	<u>Salary</u>	<u>No.</u>	<u>Salary</u>	<u>No.</u>	<u>Salary</u>
0	23	\$ 4,088.91	65	\$ 9,580.00	88	\$13,668.91
1	19	3,987.13	54	8,388.38	73	12,375.51
2	30	6,560.33	74	11,480.63	104	18,040.96
3	9	1,647.55	30	4,857.00	39	6,504.55
4	26	5,238.78	17	2,915.00	43	8,153.78
5	15	2,909.24	11	2,068.75	26	4,977.99
6	17	3,680.97	11	1,930.00	28	5,610.97
7	7	1,566.23	6	1,055.00	13	2,621.23
8	11	2,301.75	13	2,060.00	24	4,361.75
9	4	805.00	14	2,575.00	18	3,380.00
10	11	2,478.10	9	1,605.00	20	4,083.10
11	11	2,538.83	14	2,455.00	25	4,993.83
12	9	1,960.08	7	1,230.00	16	3,190.08
13	1	240.00	5	765.00	6	1,005.00
14	11	2,059.64	10	1,735.00	21	3,794.64
15	1	220.00	6	990.00	7	1,210.00
16	4	1,372.67	6	1,235.00	10	2,607.67
17	2	440.00	8	1,430.00	10	1,870.00
18	3	574.75	9	1,700.00	12	2,274.75
19	2	460.00	4	665.00	6	1,125.00
20	6	1,368.00	3	570.00	9	1,938.00
21	4	872.41	1	135.00	5	1,007.41
22	5	1,192.94	3	535.00	8	1,727.94
23	4	971.70	3	495.00	7	1,466.70
24	5	1,089.85	8	1,525.00	13	2,614.85
25	4	890.00	1	190.00	5	1,080.00
26	3	696.00	1	215.00	4	911.00
27	3	725.00			3	725.00
28	3	685.95	1	165.00	4	850.95
29	1	190.00	2	420.00	3	610.00

(Continued on next page)

SCHEDULE 2

Number of Members and Total Monthly Salaries
by Sex and Years of Prior Service

<u>Years</u>	<u>MALE</u>		<u>FEMALE</u>		<u>TOTAL</u>	
	<u>No.</u>	<u>Salary</u>	<u>No.</u>	<u>Salary</u>	<u>No.</u>	<u>Salary</u>
30	2	\$ 493.00	2	\$ 360.00	4	\$ 853.00
31	1	340.00			1	340.00
32	1	201.75	1	240.00	2	441.75
33			1	195.00	1	195.00
34	1	225.00			1	225.00
35			3	688.00	3	688.00
36						
37						
38	2	465.00			2	465.00
39	1	247.95	1	190.00	2	437.95
40	1	190.00			1	190.00
	<u>263</u>	<u>\$55,974.51</u>	<u>404</u>	<u>\$66,642.76</u>	<u>667</u>	<u>\$122,617.27</u>

SCHEDULE 3

Salary Scales

Indicating Ratio of Present Average Compensation by
Attained Age to Probable "Final Compensation"

<u>Attained Age</u>	<u>Male</u>	<u>Female</u>
16	.7588	.7036
17	.7655	.7333
18	.7721	.7619
19	.7788	.7893
20	.7854	.8155
21	.7920	.8405
22	.7987	.8667
23	.8058	.8893
24	.8133	.9071
25	.8204	.9232
26	.8274	.9387
27	.8341	.9488
28	.8403	.9577
29	.8465	.9637
30	.8527	.9690
31	.8584	.9738
32	.8659	.9780
33	.8779	.9833
34	.8929	.9887
35	.9075	.9935
36	.9230	.9952
37	.9389	.9952
38	.9544	.9952
39	.9659	.9952
40	.9757	.9952
41	.9823	.9952
42	.9872	.9952
43	.9912	.9952
44	.9947	.9952

(Continued on next page)

SCHEDULE 3

Salary Scales

Indicating Ratio of Present Average Compensation by
Attained Age to Probable "Final Compensation"

(Continued)

<u>Attained Age</u>	<u>Male</u>	<u>Female</u>
45	.9960	.9952
46	.9969	.9958
47	.9978	.9964
48	.9987	.9976
49	.9996	.9988
50	1.0000	.9994
51 and over	1.0000	1.0000

SCHEDULE 4

NORMAL RATES OF
CONTRIBUTION BY MEMBERS

<u>Percentage of Compensation</u>			<u>Percentage of Compensation</u>		
<u>Age*</u>	<u>Male</u>	<u>Female</u>	<u>Age*</u>	<u>Male</u>	<u>Female</u>
16	4.29	4.71	41	5.47	6.31
17	4.33	4.75	42	5.54	6.40
18	4.37	4.79	43	5.61	6.48
19	4.41	4.83	44	5.69	6.57
20	4.45	4.87	45	5.76	6.66
21	4.49	4.91	46	5.84	6.74
22	4.53	4.96	47	5.91	6.83
23	4.57	5.01	48	5.99	6.92
24	4.62	5.06	49	6.07	7.01
25	5.66	5.12	50	6.15	7.10
26	4.70	5.18	51	6.23	7.20
27	4.75	5.24	52	6.31	7.29
28	4.79	5.31	53	6.40	7.39
29	4.84	5.38	54	6.48	7.48
30	4.88	5.45	55	6.56	7.58
31	4.93	5.52	56	6.65	7.68
32	4.97	5.59	57	6.73	7.78
33	5.02	5.66	58	6.82	7.88
34	5.06	5.74	59	6.91	7.98
35	5.11	5.82	60	6.99	8.08
36	5.17	5.90	61	7.08	8.18
37	5.22	5.98	62	7.17	8.28
38	5.28	6.06	63	7.26	8.39
39	5.34	6.14	64	7.35	8.49
40	5.41	6.23			

*Age is nearest birthday at entry into present System.

SCHEDULE 5

Rates of Withdrawal, Mortality, Disability
and Service Retirement

MALE

<u>Age</u>	<u>Withdrawal</u>	<u>Mortality</u>	<u>Disability</u>	<u>Service</u>
20	.0717	.0015		
21	.0650	.0017		
22	.0600	.0020		
23	.0563	.0023		
24	.0529	.0026		
25	.0493	.0030		
26	.0460	.0031		
27	.0428	.0032		
28	.0400	.0033		
29	.0375	.0034		
30	.0353	.0034	.0008	
31	.0331	.0035	.0008	
32	.0310	.0035	.0009	
33	.0290	.0035	.0010	
34	.0271	.0036	.0011	
35	.0252	.0036	.0012	
36	.0231	.0036	.0014	
37	.0212	.0037	.0016	
38	.0196	.0038	.0017	
39	.0182	.0038	.0019	
40	.0170	.0039	.0021	
41	.0160	.0040	.0022	
42	.0152	.0041	.0024	
43	.0146	.0043	.0025	
44	.0142	.0045	.0027	
45	.0138	.0047	.0029	
46	.0133	.0049	.0032	
47	.0125	.0052	.0036	
48	.0115	.0055	.0041	
49	.0103	.0059	.0047	

(Continued next page)

SCHEDULE 5

Rates of Withdrawal, Mortality, Disability
and Service Retirement

(Continued)

MALE

<u>Age</u>	<u>Withdrawal</u>	<u>Mortality</u>	<u>Disability</u>	<u>Service</u>
50	.0089	.0064	.0053	
51	.0072	.0070	.0060	
52	.0058	.0077	.0068	
53	.0046	.0085	.0077	
54	.0036	.0094	.0087	
55	.0028	.0103	.0098	
56	.0021	.0113	.0113	
57	.0015	.0124	.0132	
58	.0010	.0136	.0155	
59	.0005	.0150	.0182	
60		.0165	.0212	
61		.0181	.0248	
62		.0198	.0288	
63		.0217	.0332	
64		.0237	.0380	
65		.0258		.0500
66		.0280		.0650
67		.0303		.1000
68		.0326		.1500
69		.0350		.5000
70				1.0000

SCHEDULE 6

Rates of Withdrawal, Mortality, Disability
and Service Retirement

FEMALE

<u>Age</u>	<u>Withdrawal</u>	<u>Mortality</u>	<u>Disability</u>	<u>Service</u>
20	.0650	.0015		
21	.0700	.0017		
22	.0750	.0020		
23	.0800	.0023		
24	.0850	.0026		
25	.0900	.0030		
26	.0950	.0031		
27	.1050	.0032		
28	.0900	.0033		
29	.0775	.0034		
30	.0675	.0034	.0008	
31	.0600	.0035	.0008	
32	.0557	.0035	.0009	
33	.0517	.0035	.0010	
34	.0485	.0036	.0010	
35	.0465	.0036	.0011	
36	.0438	.0036	.0012	
37	.0408	.0037	.0013	
38	.0368	.0038	.0015	
39	.0313	.0038	.0016	
40	.0243	.0039	.0018	
41	.0183	.0040	.0020	
42	.0153	.0041	.0022	
43	.0138	.0043	.0024	
44	.0128	.0045	.0026	
45	.0128	.0047	.0029	
46	.0120	.0049	.0033	
47	.0100	.0052	.0036	
48	.0075	.0055	.0040	
49	.0056	.0059	.0045	

(Continued next page)

SCHEDULE 6

Rates of Withdrawal, Mortality, Disability
and Service Retirement

(Continued)

FEMALE

<u>Age</u>	<u>Withdrawal</u>	<u>Mortality</u>	<u>Disability</u>	<u>Service</u>
50	.0046	.0064	.0050	
51	.0039	.0070	.0056	
52	.0034	.0077	.0063	
53	.0030	.0085	.0070	
54	.0027	.0094	.0078	
55	.0024	.0103	.0088	
56	.0020	.0113	.0098	
57	.0015	.0124	.0112	
58	.0009	.0136	.0127	
59		.0150	.0148	
60		.0165	.0177	
61		.0181	.0216	
62		.0198	.0261	
63		.0217	.0311	
64		.0237	.0366	
65		.0258		.0500
66		.0280		.1000
67		.0303		.2000
68		.0326		.4000
69		.0350		.6000
70				1.0000

SCHEDULE 7

Service Table

MALE

<u>Age</u>	<u>Living</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Service</u>
20	100,000	7,170	150		
21	92,680	6,024	158		
22	86,498	5,190	173		
23	81,135	4,568	187		
24	76,380	4,041	199		
25	72,140	3,557	216		
26	68,367	3,145	212		
27	65,010	2,782	208		
28	62,020	2,481	205		
29	59,334	2,225	202		
30	56,907	2,009	193	46	
31	54,659	1,809	191	44	
32	52,615	1,631	184	47	
33	50,753	1,472	178	51	
34	49,052	1,329	177	54	
35	47,492	1,197	171	57	
36	46,067	1,064	166	65	
37	44,772	949	166	72	
38	43,585	854	166	74	
39	42,491	773	161	81	
40	41,476	705	162	87	
41	40,522	648	162	89	
42	39,623	602	162	95	
43	38,764	566	167	97	
44	37,934	539	171	102	
45	37,122	512	174	108	
46	36,328	483	178	116	
47	35,551	444	185	128	
48	34,794	400	191	143	
49	34,060	351	201	160	

(Continued next page)

SCHEDULE 7

Service Table

(Continued)

MALE

<u>Age</u>	<u>Living</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Service</u>
50	33,348	297	213	177	
51	32,661	235	229	196	
52	32,001	186	246	218	
53	31,351	144	266	241	
54	30,700	111	289	267	
55	30,033	84	309	294	
56	29,346	62	332	332	
57	28,620	43	355	378	
58	27,844	28	379	432	
59	27,005	14	405	491	
60	26,095		431	553	
61	25,111		455	623	
62	24,033		476	692	
63	22,865		496	759	
64	21,610		512	821	
65	20,277		523		1,014
66	18,740		525		1,218
67	16,997		515		1,700
68	14,782		482		2,217
69	12,083		423		6,042
70	5,618				5,618

SCHEDULE 8

Service Table

FEMALE

<u>Age</u>	<u>Living</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Service</u>
20	100,000	6,500	150		
21	93,350	6,534	159		
22	86,657	6,499	173		
23	79,985	6,399	184		
24	73,402	6,239	191		
25	66,972	6,027	201		
26	60,744	5,771	188		
27	54,785	5,752	175		
28	48,858	4,397	161		
29	44,300	3,433	151		
30	40,716	2,748	138	33	
31	37,797	2,268	132	30	
32	35,367	1,970	124	32	
33	33,241	1,719	116	33	
34	31,373	1,522	113	31	
35	29,707	1,381	107	33	
36	28,186	1,235	101	34	
37	26,816	1,094	99	35	
38	25,588	942	97	38	
39	24,511	767	93	39	
40	23,612	573	92	43	
41	22,904	419	92	46	
42	22,347	342	92	49	
43	21,864	302	94	52	
44	21,416	274	96	56	
45	20,990	269	99	61	
46	20,561	247	101	68	
47	20,145	201	105	73	
48	19,766	148	109	79	
49	19,430	109	115	87	

(Continued on next page)

SCHEDULE 8

Service Table

(Continued)

FEMALE

<u>Age</u>	<u>Living</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Service</u>
50	19,119	88	122	96	
51	18,813	73	132	105	
52	18,503	56	157	130	
53	18,160	54	154	127	
54	17,825	48	168	139	
55	17,470	42	180	154	
56	17,094	34	193	168	
57	16,699	25	207	187	
58	16,280	15	221	207	
59	15,837		238	234	
60	15,365		254	272	
61	14,839		269	321	
62	14,249		282	372	
63	13,595		295	423	
64	12,877		305	471	
65	12,101		312		605
66	11,184		313		1,118
67	9,753		296		1,951
68	7,506		245		3,002
69	4,259		149		2,555
70	1,555				1,555

SCHEDULE 9

Rates of Mortality after Service Retirement

Combined Annuity Table

<u>Age</u>	<u>Male</u>	<u>Female</u>
60	.02302	.01373
61	.02493	.01812
62	.02700	.01963
63	.02923	.02126
64	.03164	.02302
65	.03425	.02493
66	.03707	.02700
67	.04012	.02923
68	.04341	.03164
69	.04697	.03425
70	.05081	.03707
71	.05495	.04012
72	.05943	.04341
73	.06425	.04697
74	.06945	.05081
75	.07506	.05495
76	.08109	.05943
77	.08759	.06425
78	.09458	.06945
79	.10210	.07506
80	.11018	.08109
81	.11886	.08759
82	.12817	.09458
83	.13814	.10210
84	.14883	.11018
85	.16027	.11886
86	.17249	.12817
87	.18553	.13814
88	.19944	.14883
89	.21425	.16027

(Continued on next page)

SCHEDULE 9

Rates of Mortality after Service Retirement

Combined Annuity Table

(Continued)

<u>Age</u>	<u>Male</u>	<u>Female</u>
90	.22999	.17249
91	.24669	.18553
92	.26439	.19944
93	.28310	.21425
94	.30285	.22999
95	.32364	.24669
96	.34548	.26439
97	.36835	.28310
98	.39225	.30285
99	.41712	.32364

SCHEDULE 10

Rates of Mortality after Disability Retirement

1943 Disability Table

<u>Age</u>	<u>Rate of Mortality</u>	<u>Age</u>	<u>Rate of Mortality</u>
25	.0391	55	.0416
26	.0344	56	.0426
27	.0329	57	.0436
28	.0319	58	.0448
29	.0315	59	.0462
30	.0314	60	.0476
31	.0315	61	.0491
32	.0316	62	.0507
33	.0318	63	.0525
34	.0319	64	.0544
35	.0321	65	.0563
36	.0323	66	.0586
37	.0325	67	.0612
38	.0327	68	.0635
39	.0329	69	.0664
40	.0332	70	.0694
41	.0335	71	.0725
42	.0336	72	.0759
43	.0341	73	.0796
44	.0345	74	.0836
45	.0349	75	.0879
46	.0354	76	.0925
47	.0359	77	.0976
48	.0364	78	.1029
49	.0370	79	.1085
50	.0376		
51	.0383		
52	.0390		
53	.0398		
54	.0406		

SCHEDULE 11

Service Annuity Values

Combined Annuity Table 2½%

Amount of Monthly Life Annuity Provided by \$1,000.

<u>Age</u>	<u>Male</u>	<u>Female</u>
55	\$5.73144	\$5.13266
56	5.90324	5.27021
57	6.08518	5.41553
58	6.27798	5.56905
59	6.48229	5.73144
60	6.69908	5.90324
61	6.92920	6.08518
62	7.17364	6.27798
63	7.43339	6.48229
64	7.70957	6.69908
65	8.00364	6.92920
66	8.31667	7.17364
67	8.65014	7.43339
68	9.00561	7.70957
69	9.38499	8.00364
70	9.78986	8.31667
71		8.65014
72		9.00561
73		9.38499
74		9.78986
75		10.21999
76		10.67561
77		11.15699
78		11.66439
79		12.19719
80		12.75579
81		13.34059
82		13.95199
83		14.58949
84		15.26349
85		15.97439
86		16.72169
87		17.50489
88		18.32349
89		19.17709
90		20.06529
91		20.98769
92		21.94389
93		22.93449
94		23.95909
95		25.01729
96		26.10869
97		27.23289
98		28.38949
99		29.57809
100		30.80829

SCHEDULE 12

Disability Annuity Values

1943 Disability Table 2½%

Amount of Monthly Life Annuity Provided by \$1,000.

MALE AND FEMALE MEMBERS

<u>Age</u>	<u>Monthly Annuity</u>	<u>Age</u>	<u>Monthly Annuity</u>
25	\$5.19387	45	\$6.10934
26	5.18188	46	6.19301
27	5.19079	47	6.28138
28	5.21290	48	6.37465
29	5.24252	49	6.47313
30	5.27633	50	6.57702
31	5.31288	51	6.68669
32	5.35176	52	6.80276
33	5.39291	53	6.92579
34	5.43634	54	7.05574
35	5.48222	55	7.19362
36	5.53064	56	7.33948
37	5.58178	57	7.49366
38	5.63578	58	7.65771
39	5.69287	59	7.83139
40	5.75309	60	8.01474
41	5.81678		
42	5.88402		
43	5.95507		
44	6.03008		