

**TRANSACTIONS OF SOCIETY OF ACTUARIES  
1958 REPORTS**

**REPORT OF THE COMMITTEE TO COOPERATE WITH  
THE N.A.I.C. IN THE CONSTRUCTION OF AN  
UP-TO-DATE MORTALITY TABLE**

**T**HIS Committee was appointed by the President of the Society of Actuaries upon authorization of the Board of Governors "to appoint a committee to cooperate with the National Association of Insurance Commissioners in the construction of an up-to-date mortality table or tables somewhat along the form of the CSO table which might be used by companies on a permissive basis." After many meetings, including meetings with members of the Subcommittee on Deficiency Reserves of the N.A.I.C., a report was made orally by members of this Committee to the Society of Actuaries in November 1956, and a formal report dated November 23, 1956, was issued. A new mortality table, temporarily designated as Table X<sub>17</sub>, constructed by this Committee in cooperation with the N.A.I.C. Subcommittee on Deficiency Reserves, was presented. The report stated that, in the opinion of the Committee, the table would be suitable as a permissive basis for the valuation of standard ordinary insurance. Copies of the report were made immediately available to the National Association of Insurance Commissioners and to the insurance companies.

When this Committee's report was presented to the Society of Actuaries in November 1956, there was conducted a panel discussion by the members of this Committee and the members of the Society were given an opportunity to express themselves. Further, informal discussions of Table X<sub>17</sub> and its implications were conducted by the Society of Actuaries at its meetings in New York in March 1957 and in St. Louis in June 1957. The panel discussion at the November 1956 meeting was reproduced verbatim in the *Transactions* of the Society of Actuaries. Abstracts of the discussions at the New York and St. Louis meetings were also published in the *Transactions*. In addition, a formal paper prepared by Mr. Charles M. Sternhell, "The New Standard Ordinary Mortality Table Proposed by the Subcommittee on Deficiency Reserves of the National Association of Insurance Commissioners," was presented at the New York meeting and discussed at that meeting and at the St. Louis meeting. The *Transactions*, therefore, contain a complete record of actuarial opinion as expressed at

the meetings of the Society of Actuaries, and such *Transactions* are available to the Commissioners and to the public generally.

With the presentation of its report in November 1956, followed by the subsequent discussions and the answering of certain technical questions regarding relative levels of male and female mortality which had been raised by the N.A.I.C. Subcommittee, the Committee had concluded that its work was probably complete. Its members did, however, hold themselves in readiness to meet with the Commissioners to answer such questions relative to the construction of Table X<sub>17</sub> as might be propounded by the Commissioners. Participation in discussions with the N.A.I.C. Subcommittee at the December 1957 meeting did, we believe, discharge that responsibility.

The report of the Subcommittee on Deficiency Reserves and New Mortality Table Review, which was submitted at the December 1957 meeting of the N.A.I.C. and approved by that organization, referred Table X<sub>17</sub> back for re-examination to the Special Committee of the Society of Actuaries. At the same time, the Subcommittee indicated that there were a number of collateral matters which it wished the Society Committee to study. It was indicated that the Subcommittee proposed to release a report early in April. It was understood that, if the Society Committee undertook the studies in question, it would attempt to have all necessary materials available in time to meet that schedule.

A meeting of the Committee was held in New York on January 7, 1958, at which time a very thorough discussion was had with respect to the assignments of the Committee by the Board of Governors of the Society of Actuaries when it was appointed in June 1956. It also considered the nature of the questions which had been placed before this Committee by the N.A.I.C. Subcommittee in the light of these assignments.

Within the terms of its assignments the Committee was asked to cooperate with the Commissioners in the preparation of an up-to-date mortality table which might be used by companies on a permissive basis. The report, dated November 23, 1956, states that, in the opinion of this Committee, Table X<sub>17</sub> "would be suitable as a permissive basis for the valuation of standard ordinary insurance." In the preparation of that report the use of the word "permissive" was dictated by the terms of the Committee's assignments and not by the characteristics of the table. This table, in the opinion of the Committee, would be suitable as a basis for the valuation of standard ordinary insurance.

It was noted by the Committee in its discussions that referral of the table to the Society Committee by the N.A.I.C. Subcommittee followed

representations by the various trade associations to the effect that such referral was desirable. Arguments presented as to the reasons therefor were based on the fact that controversy had developed within the insurance industry. The members of the Committee feel that the reasons underlying such requests were based on the question of whether adoption or nonadoption of a mortality table at this time was desirable rather than on technical grounds and that that controversy has become the basic issue. It is felt by the members of the Committee that such an issue cannot be resolved by further professional work on Table X<sub>17</sub>.

Since the last meeting of the Society this Committee has been provided by the Committee on Mortality under Ordinary Insurances and Annuities with mortality experience during policy years 1954-55 and 1955-56 (Appendix A) and with a part of the experience for the latter policy year broken down as between male and female lives (Appendix B). In addition, the Committee has been provided with mortality statistics relative to extended insurance granted as a nonforfeiture option (Appendix C). There is also appended a report of a subcommittee prepared in 1957 outlining the then existing data on the relative levels of mortality as between male and female lives (Appendix D). The Committee feels that this supplementary information is in large measure in the area of the questions which were propounded to this Committee by the N.A.I.C. Subcommittee and can be of considerable assistance to that Subcommittee in its deliberations.

The members of this Committee are well aware of the trends in the various discussions which have taken place following the presentation of Table X<sub>17</sub>. Few of the controversial questions are of a nature which, in its opinion, fall within the purview of this Committee. In any case, it would be inappropriate for this Committee to attempt to provide answers to such of them as are of a management or industry nature. The Committee has noted the fact that in June 1957 the Life Insurance Committee of the N.A.I.C. authorized the appointment of an advisory committee of industry representatives to work with its Subcommittee. Such an advisory committee would be in a better position to discuss the facets of industry and supervisory policy, as well as to discuss the need for a new table. Such a review would involve problems in addition to the technical problems to which this Committee has been limited by reason of the terms of its appointment.

APPENDIX A  
RECENT MORTALITY EXPERIENCE ON BASIS  
OF MORTALITY TABLE X<sub>17</sub>

The mortality data used in the construction of Table X<sub>17</sub> cover the period between 1950 and 1954 policy anniversaries. Comparable mortality experience for two additional policy years, *i.e.*, 1954-1955 and 1955-1956, has now become available and has been analyzed by following exactly the same method as that used in the analysis of the 1950-1954 experience.

This study covers the combined mortality experience of the 15 large companies that contribute data for all policy years to the annual studies of the Committee on Mortality under Ordinary Insurances and Annuities. This study covers their experience under standard medically examined issues during the 6th to 15th policy years and under all standard issues during the 16th and subsequent policy years. Experience during the first 5 policy years is excluded.

This study covers the mortality experience by amount of insurance at attained ages 20 and over, excluding the experience on insurance issued at ages 65 and over. The conversion of the data at policy year durations 6 to 15 from an issue age basis to an attained age basis was handled in exactly the same way as in the construction of Table X<sub>17</sub> (*TSA IX*, 3).

The results of this study are shown in the following tables:

Table 1—Summary of experience in 1950-1954, 1954-1955 and 1955-1956

Table 2—1950-1954 experience by attained age

Table 3—1954-1955 experience by attained age

Table 4—1955-1956 experience by attained age

Table 5—1950-1956 experience by attained age

TABLE 1  
COMBINED MORTALITY EXPERIENCE OF 15 LARGE COMPANIES  
BETWEEN 1950 AND 1956 POLICY ANNIVERSARIES  
ON BASIS OF MORTALITY TABLE X<sub>17</sub>  
EXPERIENCE BY AMOUNT OF INSURANCE AT ATTAINED AGES  
20 AND OVER, EXCLUDING FIRST 5 POLICY YEARS

Experience between Anniversaries in	Expected Deaths	Actual Deaths	Ratios of Actual to Expected Deaths
1950 and 1954 . . .	\$2,330,564,000	\$1,986,774,000	85.2%
1954 and 1955 . . .	663,472,000	538,528,000	81.2
1955 and 1956 . . .	708,940,000	570,762,000	80.5
1950 and 1956 . . .	\$3,702,976,000	\$3,096,064,000	83.6%

TABLE 2  
 COMBINED MORTALITY EXPERIENCE OF 15 LARGE COMPANIES  
 BETWEEN 1950 AND 1954 POLICY ANNIVERSARIES  
 ON BASIS OF MORTALITY TABLE X<sub>17</sub>  
 EXPERIENCE BY AMOUNT OF INSURANCE AT ATTAINED AGES  
 20 AND OVER, EXCLUDING FIRST 5 POLICY YEARS

Attained Ages	Expected Deaths	Actual Deaths	Ratios of Actual to Expected Deaths
20-29.....	\$ 15,229,000	\$ 9,184,000	60.3%
30-39.....	71,715,000	44,453,000	62.0
40-49.....	250,914,000	200,248,000	79.8
50-59.....	549,174,000	477,491,000	86.9
60-69.....	748,926,000	650,529,000	86.9
70-79.....	523,818,000	456,330,000	87.1
80 and over.....	170,788,000	148,539,000	87.0
20 and over.....	\$2,330,564,000	\$1,986,774,000	85.2%

TABLE 3  
 COMBINED MORTALITY EXPERIENCE OF 15 LARGE COMPANIES  
 BETWEEN 1954 AND 1955 POLICY ANNIVERSARIES  
 ON BASIS OF MORTALITY TABLE X<sub>17</sub>  
 EXPERIENCE BY AMOUNT OF INSURANCE AT ATTAINED AGES  
 20 AND OVER, EXCLUDING FIRST 5 POLICY YEARS

Attained Ages	Expected Deaths	Actual Deaths	Ratios of Actual to Expected Deaths
20-29.....	\$ 3,939,000	\$ 2,467,000	62.6%
30-39.....	19,751,000	11,418,000	57.8
40-49.....	70,952,000	51,175,000	72.1
50-59.....	151,914,000	122,572,000	80.7
60-69.....	210,879,000	176,255,000	83.6
70-79.....	152,353,000	127,296,000	83.6
80 and over.....	53,684,000	47,345,000	88.2
20 and over.....	\$663,472,000	\$538,528,000	81.2%

**TABLE 4**  
**COMBINED MORTALITY EXPERIENCE OF 15 LARGE COMPANIES**  
**BETWEEN 1955 AND 1956 POLICY ANNIVERSARIES**  
**ON BASIS OF MORTALITY TABLE X<sub>17</sub>**  
**EXPERIENCE BY AMOUNT OF INSURANCE AT ATTAINED AGES**  
**20 AND OVER, EXCLUDING FIRST 5 POLICY YEARS**

Attained Ages	Expected Deaths	Actual Deaths	Ratios of Actual to Expected Deaths
20-29.....	\$ 3,992,000	\$ 2,282,000	57.2%
30-39.....	20,844,000	11,218,000	53.8
40-49.....	74,769,000	52,263,000	69.9
50-59.....	159,400,000	128,340,000	80.5
60-69.....	222,201,000	180,937,000	81.4
70-79.....	166,566,000	142,966,000	85.8
80 and over.....	61,168,000	52,756,000	86.2
20 and over.....	\$708,940,000	\$570,762,000	80.5%

**TABLE 5**  
**COMBINED MORTALITY EXPERIENCE OF 15 LARGE COMPANIES**  
**BETWEEN 1950 AND 1956 POLICY ANNIVERSARIES**  
**ON BASIS OF MORTALITY TABLE X<sub>17</sub>**  
**EXPERIENCE BY AMOUNT OF INSURANCE AT ATTAINED AGES**  
**20 AND OVER, EXCLUDING FIRST 5 POLICY YEARS**

Attained Ages	Expected Deaths	Actual Deaths	Ratios of Actual to Expected Deaths
20-29.....	\$ 23,160,000	\$ 13,933,000	60.2%
30-39.....	112,310,000	67,089,000	59.7
40-49.....	396,635,000	303,686,000	76.6
50-59.....	860,488,000	728,403,000	84.6
60-69.....	1,182,006,000	1,007,721,000	85.3
70-79.....	842,737,000	726,592,000	86.2
80 and over.....	285,640,000	248,640,000	87.0
20 and over.....	\$3,702,976,000	\$3,096,064,000	83.6%

## APPENDIX B

1955-1956 MORTALITY EXPERIENCE BY SEX SEPARATELY FOR  
MEDICALLY EXAMINED AND NONMEDICAL ISSUES  
ON BASIS OF MORTALITY TABLE X<sub>17</sub>

At the request of the Special Committee on New Mortality Tables, the Committee on Mortality under Ordinary Insurances and Annuities asked companies contributing data to the intercompany study of the experience under standard Ordinary insurance issues between 1955 and 1956 policy anniversaries to separate their data for the first 15 policy years by sex, if possible. Of the 16 contributing companies, 11 were able to submit their experience during the first 15 policy years separately for males and females (a) on standard medically examined issues, and (b) on standard nonmedical issues.

This study covers the combined mortality experience of these 11 companies during the 6th to 15th policy years at attained ages 20 and over, excluding the experience on medically examined business issued at ages 65 and over and the experience on nonmedical business issued at ages 50 and over. Experience during the first 5 policy years is excluded. This mortality experience is based on amounts of insurance.

Expected deaths for each quinquennial age group at issue and individual policy year duration were computed on the basis of Mortality Table X<sub>17</sub>. Actual and expected deaths were then combined on an attained age basis in the same way as in the construction of Table X<sub>17</sub> (TSA IX, 3).

The results of this study are shown in the following tables:

Table 1—Summary of experience by sex for medically examined issues, non-medical issues, and all issues

Table 2—Experience on medically examined issues by sex and attained age

Table 3—Experience on nonmedical issues by sex and attained age

Table 4—Experience on all issues by sex and attained age

It should be noted that this study is based on only one year's experience and, for this reason, may be subject to statistical fluctuations.

TABLE 1  
 COMBINED MORTALITY EXPERIENCE OF 11 LARGE COMPANIES  
 BETWEEN 1955 AND 1956 POLICY ANNIVERSARIES  
 ON BASIS OF MORTALITY TABLE X<sub>17</sub>  
 EXPERIENCE BY AMOUNT OF INSURANCE AT ATTAINED AGES  
 20 AND OVER, AND AT POLICY YEAR DURATIONS 6-15

Sex	Expected Deaths	Actual Deaths	Ratios of Actual to Expected Deaths	Ratios of Male and Female Ratios to Total Ratios
Medically Examined Issues				
Male.....	\$82,423,000	\$56,760,000	68.9%	105.4%
Female.....	9,063,000	3,043,000	33.6	51.4
Total.....	\$91,486,000	\$59,803,000	65.4%	.....
Nonmedical Issues				
Male.....	\$ 6,408,000	\$ 4,442,000	69.3%	109.3%
Female.....	1,715,000	710,000	41.4	65.3
Total.....	\$ 8,123,000	\$ 5,152,000	63.4%	.....
All Issues				
Male.....	\$88,831,000	\$61,202,000	68.9%	105.7%
Female.....	10,778,000	3,753,000	34.8	53.4
Total.....	\$99,609,000	\$64,955,000	65.2%	.....



**TABLE 2**  
**COMBINED MORTALITY EXPERIENCE OF 11 LARGE COMPANIES BETWEEN**  
**1955 AND 1956 POLICY ANNIVERSARIES ON STANDARD MEDICALLY**  
**EXAMINED ISSUES ON BASIS OF MORTALITY TABLE X<sub>17</sub>**  
**EXPERIENCE BY AMOUNT OF INSURANCE AT ATTAINED AGES 20**  
**AND OVER, AND AT POLICY YEAR DURATIONS 6-15**

ATTAINED AGES	ACTUAL DEATHS		RATIOS OF ACTUAL TO EXPECTED DEATHS			RATIOS OF MALE AND FEMALE RATIOS TO TOTAL RATIOS	
	Male	Female	Male	Female	Total	Male	Female
20-29.....	\$ 847,000	\$ 81,000	65.7%	29.1%	59.2%	111.0%	49.2%
30-39.....	3,572,000	292,000	53.7	37.5	52.0	103.3	72.1
40-49.....	14,778,000	519,000	70.8	28.1	67.3	105.2	41.8
50-59.....	22,375,000	1,091,000	73.2	34.0	69.4	105.5	49.0
60-69.....	13,135,000	815,000	66.4	34.0	62.9	105.6	54.1
70 and over...	2,053,000	245,000	63.4	44.5	60.6	104.6	73.4
20 and over...	\$56,760,000	\$3,043,000	68.9%	33.6%	65.4%	105.4%	51.4%

**TABLE 3**  
**COMBINED MORTALITY EXPERIENCE OF 11 LARGE COMPANIES BETWEEN**  
**1955 AND 1956 POLICY ANNIVERSARIES ON STANDARD NONMEDICAL**  
**ISSUES ON BASIS OF MORTALITY TABLE X<sub>17</sub>**  
**EXPERIENCE BY AMOUNT OF INSURANCE AT ATTAINED AGES 20**  
**AND OVER, AND AT POLICY YEAR DURATIONS 6-15**

ATTAINED AGES	ACTUAL DEATHS		RATIOS OF ACTUAL TO EXPECTED DEATHS			RATIOS OF MALE AND FEMALE RATIOS TO TOTAL RATIOS	
	Male	Female	Male	Female	Total	Male	Female
20-29.....	\$ 512,000	\$122,000	57.9%	34.7%	51.3%	112.9%	67.6%
30-39.....	1,028,000	239,000	56.9	38.9	52.3	108.8	74.4
40-49.....	2,016,000	280,000	75.6	48.4	70.8	106.8	68.4
50 and over...	886,000	69,000	84.4	40.6	78.3	107.8	51.9
20 and over...	\$4,442,000	\$710,000	69.3%	41.4%	63.4%	109.3%	65.3%

TABLE 4

COMBINED MORTALITY EXPERIENCE OF 11 LARGE COMPANIES BETWEEN 1955 AND 1956 POLICY ANNIVERSARIES ON STANDARD MEDICALLY EXAMINED AND NONMEDICAL ISSUES ON BASIS OF MORTALITY TABLE X<sub>17</sub>  
EXPERIENCE BY AMOUNT OF INSURANCE AT ATTAINED AGES 20 AND OVER, AND AT POLICY YEAR DURATIONS 6-15

ATTAINED AGES	ACTUAL DEATHS		RATIOS OF ACTUAL TO EXPECTED DEATHS			RATIO OF MALE AND FEMALE RATIOS TO TOTAL RATIOS	
	Male	Female	Male	Female	Total	Male	Female
20-29.....	\$ 1,359,000	\$ 203,000	62.5%	32.2%	55.7%	112.2%	57.8%
30-39.....	4,600,000	531,000	54.4	38.1	52.1	104.4	73.1
40-49.....	16,794,000	799,000	71.4	32.9	67.8	105.3	48.5
50-59.....	23,213,000	1,157,000	73.5	34.3	69.7	105.5	49.2
60-69.....	13,183,000	818,000	66.4	34.0	62.9	105.6	54.1
70 and over...	2,053,000	245,000	63.4	44.5	60.6	104.6	73.4
20 and over...	\$61,202,000	\$3,753,000	68.9%	34.8%	65.2%	105.7%	53.4%

## APPENDIX C

RECENT MORTALITY EXPERIENCE ON EXTENDED TERM INSURANCE ON BASIS OF MORTALITY TABLE X<sub>17</sub>

Four of the 16 large companies that contribute data to the annual studies of the Committee on Mortality under Ordinary Insurances and Annuities contributed data on their recent mortality experience on extended term insurance on standard policies.

From these data it is clear that the mortality experience on extended term insurance varies considerably among companies, depending on various factors such as the following:

1. The mortality experience on extended term insurance is likely to be significantly higher if this option is not the automatic nonforfeiture option than if it automatically becomes effective upon nonpayment of the premium. This reflects selection against the company.
2. The automatic premium loan provision has been increasing in popularity in recent years. Companies in which this provision is used extensively are likely to experience high mortality on extended term insur-

ance as a result of the following two factors. First, the selection against the company referred to in (1) above will tend to produce high mortality because the poor mortality risks will generally go on extended term insurance instead of using the automatic premium loan option. Second, the relatively low volume of recently issued business going on extended term insurance will tend to produce high aggregate mortality because only a relatively small portion of the extended term insurance exposure will experience select mortality.

3. The mortality experience on extended term insurance may be affected significantly by the methods used in studying the mortality experience during the first few months after lapse. Exposures on extended term insurance may be understated significantly because of the delay that takes place before valuation records are adjusted to reflect the fact that a policy has gone on the extended term basis. Exposures may also be understated because some policies may remain under extended term insurance for a short period without ever getting identified as extended term insurance on company records. This situation may occur on cases where the policy is reinstated shortly after lapse, or where the cash value or reduced paid-up benefit has been elected shortly after lapse. Any understatement of exposures on extended term insurance would, of course, tend to overstate the mortality experience on extended term insurance. Companies may also differ in their treatment of deaths occurring after the end of the grace period but before the date on which the change to extended term insurance has been entered on the company records. This would, of course, also have a significant effect on a company's mortality experience on extended term insurance.

The foregoing comments clearly indicate the need for caution in interpreting any particular company's mortality experience on extended term insurance. In view of the variations among companies with respect to the factors described above, it was decided not to combine the experience of the four companies but to show each company's experience separately with appropriate comments.

Table 1 covers the mortality experience of Company A between 1951 and 1955 policy anniversaries on the basis of number of policies and amounts of insurance. The experience during the first year on extended term insurance is shown separately from the experience during the second and later years on extended term insurance.

Table 2 covers the mortality experience of Company B during the calendar year 1953 on the basis of amounts of insurance. The experience on original policies issued during 1941 and prior years, when extended

term insurance was not the automatic nonforfeiture option, is shown separately from the experience on original policies issued during 1942 and subsequent years, when extended term insurance was the automatic nonforfeiture option.

Table 3 covers the mortality experience of Company C during the calendar years 1951 to 1954, inclusive, on the basis of number of policies and amounts of insurance. The experience on cases where extended term insurance would expire during the same calendar year as that in which it

TABLE 1  
MORTALITY EXPERIENCE OF COMPANY A ON EXTENDED TERM INSURANCE  
BETWEEN POLICY ANNIVERSARIES IN 1951 AND 1955 ON BASIS  
OF MORTALITY TABLE X<sub>17</sub>

ATTAINED AGES	EXPECTED CLAIMS		ACTUAL CLAIMS		RATIOS OF ACTUAL TO EXPECTED CLAIMS	
	Number	Amount	Number	Amount	Number	Amount
First Year on Extended Term						
Under 60 . . . . .	19.7	\$ 63,300	16	\$ 50,800	81.2%	80.3%
60-69 . . . . .	7.4	32,800	14	55,800	189.2	170.1
70 and over . . . . .	8.2	26,400	13	40,900	158.5	154.9
All Ages . . . . .	35.3	\$122,500	43	\$147,500	121.8%	120.4%
Second and Later Years on Extended Term						
Under 50 . . . . .	22.0	\$ 49,300	19	\$ 23,100	86.4%	46.9%
50-59 . . . . .	26.4	71,800	24	89,200	90.9	124.2
60-69 . . . . .	50.3	107,700	43	169,500	85.5	157.4
70 and over . . . . .	52.9	106,200	31	131,700	58.6	124.0
All Ages . . . . .	151.6	\$335,000	117	\$413,500	77.2%	123.4%
All Years Combined						
Under 50 . . . . .	34.8	\$ 88,800	31	\$ 56,200	89.1%	63.3%
50-59 . . . . .	33.3	95,600	28	106,900	84.1	111.8
60-69 . . . . .	57.7	140,500	57	225,300	98.8	160.4
70 and over . . . . .	61.1	132,600	44	172,600	72.0	130.2
All Ages . . . . .	186.9	\$457,500	160	\$561,000	85.6%	122.6%

NOTE.—Extended term insurance is the contractual automatic nonforfeiture option but the automatic premium loan provision has been elected and used extensively in recent years.

starts is excluded. It has been estimated that the inclusion of this experience would have reduced the ratio by number of policies from 116.9% to about 110% and the ratio by amount of insurance from 139.7% to about 125%.

Table 4 covers the mortality experience of Company D during the period between 1950 and 1955 policy anniversaries on the basis of number of policies and amounts of insurance. The low mortality ratios for this company undoubtedly reflect the fact that all deaths within 90 days of lapse were omitted to adjust for the usual understatement of extended term exposures.

TABLE 2  
MORTALITY EXPERIENCE OF COMPANY B ON EXTENDED TERM  
INSURANCE DURING CALENDAR YEAR 1953 ON BASIS  
OF MORTALITY TABLE X<sub>17</sub>

ATTAINED AGES	AMOUNT OF EXPECTED CLAIMS	ACTUAL CLAIMS		RATIOS OF ACTUAL TO EXPECTED CLAIMS BY AMOUNT
		Number	Amount	
Original Policies Issued during 1941 and Prior (extended term insurance was not the automatic option)				
Under 30.....	\$ 9,840	13	\$ 11,979	121.7
30-39.....	55,606	56	77,187	138.8
40-49.....	112,229	99	127,198	113.3
50-59.....	126,453	103	189,551	149.9
60-69.....	107,568	66	127,961	119.0
70 and over...	67,411	44	111,042	164.7
All Ages.....	\$479,107	381	\$644,918	134.6
Original Policies Issued during 1942 and Later (extended term insurance was the automatic option)				
Under 30.....	\$137,321	64	\$ 93,244	67.9
30-39.....	148,460	63	120,364	81.1
40-49.....	155,435	63	118,698	76.4
50-59.....	87,961	49	93,664	106.5
60 and over...	35,289	28	38,815	110.0
All Ages.....	\$564,466	267	\$464,785	82.3%

NOTE.—The automatic premium loan provision has been used very infrequently. The mortality experience on policies issued in 1941 and prior years is somewhat overstated as a result of understatement of exposures.

TABLE 3

MORTALITY EXPERIENCE OF COMPANY C\* ON EXTENDED TERM INSURANCE  
DURING CALENDAR YEARS 1951 TO 1954, INCLUSIVE, ON BASIS  
OF MORTALITY TABLE X<sub>17</sub>

ATTAINED AGES	EXPECTED CLAIMS		ACTUAL CLAIMS		RATIOS OF ACTUAL TO EXPECTED CLAIMS	
	Number	Amount	Number	Amount	Number	Amount
Under 30.....	92	\$ 134,021	71	\$ 112,800	77.2%	84.2%
30-39.....	183	288,609	176	308,800	96.2	107.0
40-49.....	319	602,700	373	706,600	116.9	117.2
50-59.....	382	830,910	396	973,100	103.7	117.1
60-69.....	348	784,416	466	1,389,300	133.9	177.1
70 and over.....	202	406,383	302	766,500	149.5	188.6
All Ages.....	1,526	\$3,047,039	1,784	\$4,257,100	116.9%	139.7%

\* Excluding the experience on cases where extended term insurance would expire during the same calendar year as that in which it starts. It has been estimated that the inclusion of this experience would have reduced the ratio by number of policies from 116.9% to about 110% and the ratio by amount of insurance from 139.7% to about 125%.

NOTE.—Extended term insurance is the contractual automatic nonforfeiture option but the automatic premium loan provision has been elected and used extensively in recent years. Over 95% of the experience, based on amount of expected claims, arises from policies issued in 1947 and prior years. The relatively high mortality reflects the relatively low proportion of this experience that arises from recently issued policies that are still in the select period.

TABLE 4

MORTALITY EXPERIENCE OF COMPANY D ON EXTENDED TERM INSURANCE  
BETWEEN POLICY ANNIVERSARIES IN 1950 AND 1955 ON BASIS  
OF MORTALITY TABLE X<sub>17</sub>

ATTAINED AGES	EXPECTED CLAIMS		ACTUAL CLAIMS*		RATIOS OF ACTUAL TO EXPECTED CLAIMS	
	Number	Amount	Number	Amount	Number	Amount
Under 40.....	35.1	\$ 83,900	30	\$ 71,600	85.5%	85.3%
40-49.....	57.1	175,200	54	136,600	94.6	78.0
50-59.....	57.7	197,200	47	197,700	81.5	100.3
60 and over....	35.6	129,300	34	152,500	95.5	117.9
All Ages.....	185.5	\$585,600	165	\$558,400	88.9%	95.4%

\* All deaths within 90 days of lapse are excluded.

NOTE.—Extended term insurance is the contractual automatic nonforfeiture option but the automatic premium loan provision has been elected and used extensively in recent years.

## APPENDIX D

## REPORT OF THE SUBCOMMITTEE ON THE DIFFERENTIAL BETWEEN MALE AND FEMALE MORTALITY TO THE SOCIETY OF ACTUARIES COMMITTEE TO COOPERATE WITH THE N.A.I.C. IN THE CONSTRUCTION OF AN UP-TO-DATE MORTALITY TABLE

This report reviews the material currently available on the differential between the mortality of males and females exhibited in the following types of data:

- a) the white population of the United States
- b) lives covered by Industrial insurance.
- c) lives covered by Ordinary insurance.

Since the data presently available bearing directly on Ordinary insurance are fragmentary, there is also given a description of the further data that should be available early in 1958.

This report is confined to mortality statistics. It is a familiar fact that other considerations entering into the calculation of premiums, reserves and nonforfeiture values, such as the following, may act to offset the female mortality advantage on particular classes of policies:

- (i) The average size of policies issued on female risks is smaller, necessitating a larger charge for per policy issue and administrative expenses. This is particularly important on relatively small policies (those less than \$5,000, say) where the premium charged is at a uniform rate per thousand dollars of insurance.
- (ii) Disability claim costs are somewhat higher for females than for males. This is particularly important on policies providing non-optional waiver of premium disability benefits.
- (iii) The rates of mortality of female annuitants are also lower than those of males. This is particularly important on those endowment policies where a life income is the preponderant benefit.

There are additional circumstances when it may not be proper to take account of the difference between male and female mortality in premiums, reserves and nonforfeiture values. For example, many small policies are underwritten in broad classifications, in which the differences in occupation or physical characteristics of males classified alike may be expected to produce mortality differences as great as that between housewives and male clerks.

*Population Data*

There are in existence a series of mortality tables exhibiting separately the mortality of males and females in the white population of the United States. Recent data are contained in the special reports on vital statistics of the United States Department of Health, Education, and Welfare.

These reports indicate that, at the beginning of the 1950's, a white female resident of the United States exhibited significantly lower mortality than a white male the same age. They also show that, from 1949-51 to 1955, white female mortality decreased faster than that of white males (see Exhibit 1).

In Exhibit 2 there are summarized data showing the mortality by

## EXHIBIT 1

RATIO OF FEMALE TO MALE MORTALITY  
(10<sup>m</sup>%)  
WHITE PERSONS, UNITED STATES  
1949-51 AND 1955

Age	1955*	1949-51
25-34 . . . . .	.53	.61
35-44 . . . . .	.59	.61
45-54 . . . . .	.51	.56
55-64 . . . . .	.50	.56
65-74 . . . . .	.63	.67
75-84 . . . . .	.78	.81

\* Provisional Monthly Vital Statistics Report, Annual Summary for 1955--Part 2, Vol. 4, No. 13, p. 4.

marital status of white females resident in the United States in 1949-51. The differentials by marital status are surprisingly large; in fact, in the age range 25-44, the observed death rates of widowed and divorced white females are greater than those of white males in the same age groups.

In Exhibit 3 there is shown the variation by geographical subdivision and age of the ratios of female to male mortality among white persons resident in the United States in 1949-51.

Apart from the recent further relative improvement in female mortality, and the variations by marital status and geographical subdivision, Exhibit 4 gives an over-all idea of the financial effect on life insurance policies of 1949-51 U.S. white population mortality. Net premiums for Whole Life, 20 Payment Life and 20 Year Endowment policies were computed from commutation columns based on this mortality and 2½% interest. For each of these plans Exhibit 4 shows, for white females aged 25, 35,



EXHIBIT 2

FEMALE DEATH RATES BY MARITAL STATUS AS PERCENTAGE OF TOTAL MALE DEATH RATE, WHITE PERSONS, UNITED STATES, 1949-1951

AGE GROUP	MARITAL STATUS OF FEMALES				
	Single	Married	Widowed	Divorced	Total
Under 20.....	74%	27%	134%	45%	73%
20-24.....	53	41	152	83	46
25-34.....	94	54	143	119	61
35-44.....	83	56	103	102	61
45-54.....	63	52	74	73	56
55-59.....	57	51	62	68	54
60-64.....	57	54	65	71	58
65-69.....	60	57	66	81	62
70-74.....	70	64	73	96	71
75 and over..	87	63	89	109	85

NOTE.—Rates for age group "Under 20" are computed as follows: rates for total and single are based on deaths and population at ages 0-19 years; rates for married, widowed and divorced are based on deaths and population at ages 15-19 years.

SOURCE: Vital Statistics—Special Reports Vol. 39, #7, U.S. Public Health Service.

EXHIBIT 3

RATIO OF FEMALE TO MALE MORTALITY ( $q_x$ ) WHITE PERSONS, UNITED STATES, 1949-51

Geographic Division	Age (x)					
	25	35	45	55	65	75
United States.....	.51	.65	.59	.54	.60	.75
New England.....	.62	.70	.59	.56	.62	.75
Middle Atlantic...	.60	.73	.62	.57	.63	.78
East No. Central..	.53	.68	.61	.56	.62	.77
West No. Central..	.48	.62	.59	.56	.61	.75
South Atlantic...	.45	.61	.52	.48	.57	.73
East So. Central..	.50	.61	.59	.50	.61	.76
West So. Central..	.51	.60	.56	.47	.55	.71
Mountain.....	.54	.58	.60	.51	.56	.71
Pacific.....	.47	.63	.55	.50	.53	.69

SOURCE: Life Tables for Geographic Divisions, computed by Statistical Bureau, Metropolitan Life Insurance Company.

45, 55 and 65, the issue age for which the white male net level premium is equal to the white female net level premium at the tabulated issue age, and the difference between these two issue ages. It will be noted that this difference is at least five years except at issue age 65.

### *Industrial Data*

Messrs. E. A. Lew and M. Spiegelman presented to the 1957 Western Spring Meeting of the Society of Actuaries a paper on the 1950-55 mortality of policyholders covered by Metropolitan Industrial life insurance. The experience reported in that paper, representing a very substantial

EXHIBIT 4  
AGE DIFFERENTIAL BETWEEN WHITE  
MALES AND WHITE FEMALES ON BASIS  
OF U.S. LIFE TABLES 1949-51 AND  
2½% INTEREST

White Female Age	Equivalent White Male Age	Age Differential in Years
Whole Life		
25 . . . . .	19.18	5.82
35 . . . . .	29.69	5.31
45 . . . . .	39.72	5.28
55 . . . . .	49.99	5.01
65 . . . . .	61.01	3.99
20 Payment Life		
25 . . . . .	19.00	6.00
35 . . . . .	29.64	5.36
45 . . . . .	39.49	5.51
55 . . . . .	49.39	5.61
65 . . . . .	60.59	4.41
20 Year Endowment		
25 . . . . .	12.40	12.60
35 . . . . .	29.17	5.83
45 . . . . .	38.55	6.45
55 . . . . .	48.39	6.61
65 . . . . .	60.32	4.68

Source: Vital Statistics—Special Reports Vol. 41, #2, U.S. Public Health Service.

volume of data differentiated by race, sex and age, exhibits marked similarities (as to white lives) with recent experience among the general population of the United States, both as to level of current mortality and as to the trend of mortality improvement over recent years (see Exhibit 5).

#### *Ordinary Insurance Data*

While population and Industrial insurance data thus indicate the probable existence of mortality differential by sex in any large subgroup of the population of the United States, these data are not a reliable indication of the size and gradation by age of the differential in the case of lives underwritten for Ordinary insurance. Obvious problems in converting population or Industrial data to Ordinary are:

- (1) The really reliable collections of Ordinary insurance data, such as those of the Society's Committee on Mortality under Ordinary Insurances and Annuities, constitute an unknown mixture of male and female lives. Thus, even if the differential in mortality by sex were known, it would be impossible to say how much the mortality rates of the female section of the data are below, and those of the male section above, the average of the unknown mixture.
- (2) The distribution by marital or economic status of those females insured under Ordinary policies may be different from that of females in the general population. Moreover, the Ordinary underwriting procedures eliminate from the standard group (particularly for the larger policies) the males in hazardous occupations and risks with medical impairments at issue. The net effect may be to produce a mortality differential by sex different from that among the population generally or from that among Industrial policyholders who are subject to much less severe selection than applicants for standard Ordinary insurance.

For these reasons, experience differentiated by sex of lives insured under Ordinary policies is of major importance in determining the mortality basis of premium rates, nonforfeiture values and reserves for Ordinary life insurance policies. One such experience has been published recently—that of the Prudential in 1948–52—by E. A. Rode in his paper in *TSA VI*.

Reliable conclusions cannot be drawn from the experience of a single company. Obvious reasons for differences in experience among the companies are:

- (i) Different distributions over the four-way breakdown: male, medical and nonmedical; female, medical and nonmedical.
- (ii) The differential effects of the geographical distribution, predominant agency market and underwriting processes affecting a company's results.

EXHIBIT 5

MORTALITY OF WHITE PERSONS IN METROPOLITAN LIFE INSURANCE COMPANY INDUSTRIAL DEPARTMENT COMPARED WITH WHITE PERSONS IN THE GENERAL POPULATION OF THE UNITED STATES DURING 1951-1953, AND CHANGE SINCE 1946-1950—BY SEX AND AGE

Age Period Years	White Males	White Females
Ratio of Death Rates: M.L.I. Co. to U.S., 1951-1953		
1-74* . . . . .	1.05	1.00
1-4 . . . . .	.92	.91
5-14 . . . . .	.86	1.00
15-24 . . . . .	.81	.71
25-44 . . . . .	1.04	.94
45-64 . . . . .	1.17	1.10
65-74 . . . . .	1.10	1.09
Percentage Change: 1951- 1953 since 1946-1950 Metropolitan Life In- surance Company		
1-74* . . . . .	- 3%	-14%
1-4 . . . . .	-14	- 9
5-14 . . . . .	-14	0
15-24 . . . . .	- 7	-29
25-44 . . . . .	- 7	-17
45-64 . . . . .	- 1	- 8
65-74 . . . . .	- 1	- 9
Percentage Change: 1951- 1953 since 1946-1950 General Population of the United States		
1-74* . . . . .	-10%	- 9%
1-4 . . . . .	-19	-15
5-14 . . . . .	-13	-20
15-24 . . . . .	- 6	-13
25-44 . . . . .	-10	-16
45-64 . . . . .	- 3	- 9
65-74 . . . . .	- †	- 7

\* Based on standardized death rates.

† Less than 0.5 percent.

Source: Table 3 of Lew and Spiegelman's paper in T.S.A IX.

For these reasons, the subcommittee secured for study the experience of five other companies. The results of these studies may be summarized:

*Company A* submitted mortality experience for Ordinary issues of 1940 and later, exposed between 1946 and 1955 anniversaries, and analyzed not only by age group at issue and policy year but also by sex and medical/nonmedical. Exhibit 6 shows the ratios of female to male mortality for medical and nonmedical business separately and combined. This latter ratio is a function of the proportions of medical and nonmedical in the combination. Incidentally, approximate adjustment of *Company A's* 1948-52 experience to the proportions in which medical and nonmedical business occurred at the various attained ages in the Prudential indicates

## EXHIBIT 6

RATIO OF FEMALE TO MALE RATIO OF ACTUAL MORTALITY  
TO EXPECTED BY 1946-49 SELECT BASIC TABLE

CENTRAL ATTAINED AGE GROUP	COMPANY A*			PRUDENTIAL MEDICAL AND NONMEDICAL †
	Medical	Nonmedical	Combined	
10-29 .....	38.6%	47.7%	44.1%	57.4%
30-39 .....	71.3	74.2	72.3	82.2
40-49 .....	54.8	46.4	53.9	69.2
50-64 .....	39.5	41.7	39.6	51.7
65 and over .....	43.8	.....	43.8	25.9
All Ages .....	47.5%	53.9%	48.7%	61.0%

\* Issues of 1940 and later exposed between anniversaries in 1946 and 1955.

† Issues of 1939 and later exposed between anniversaries in 1948 and 1952, excluding policy years after the tenth.

that there remains a difference between the experience of *Company A* and the Prudential, presumably arising from the differences in predominant agency market and underwriting processes in the two companies. *Company A* issues Ordinary and Group, but not Industrial insurance.

*Company B* analyzed by sex that portion of its contribution to the Society's 1955 Build Study consisting of standard medical issues, excluding the first five policy years. Exhibit 7 shows the resulting ratios of female to male ratios of actual to expected by the basic table for the 1955 Build and Blood Pressure study. (This basic table will be published by the Society when the committee in charge has completed its current analysis of the results of the 1955 Build Study.) There are also shown the most nearly comparable ratios derivable from the Prudential experience underlying Mr. Rode's paper.

*Company C* has within recent years made mortality studies, separated

by sex, of experience in 1949 of selected years of issue beyond the fifth policy year, and of experience in 1956 of all years of issue, without separation by policy duration or medical and nonmedical. The ratios of female to male mortality rates in various attained age groups of these two studies are shown in Exhibit 8. It will be noted that the combined medical and nonmedical experience for the sample years of issue of this company in

## EXHIBIT 7

RATIOS OF FEMALE TO MALE RATIOS OF  
ACTUAL MORTALITY TO EXPECTED,  
EXCLUDING THE FIRST FIVE POLICY  
YEARS

Central Attained Age Group	Company B*	Prudential†
20-29.....	79.0%	55.5%
30-39.....	81.7	75.4
40-49.....	63.9	68.4
50-59.....	54.0	60.2
60-69.....	46.7	56.2
70 and over....	48.4	74.9
All Ages.....	57.3%	64.1%

\* Standard medical issues of 1935 and later exposed between 1940 and 1954 anniversaries; expected by 1955 Build and Blood Pressure basic table.

† Standard medical and nonmedical issues of 1919 and later exposed between 1948 and 1952 anniversaries; expected by X<sub>1</sub>s.

## EXHIBIT 8

RATIOS OF FEMALE TO MALE MORTALITY RATES IN STANDARD  
ORDINARY EXPERIENCE OF COMPANY C

ATTAINED AGE GROUP	1949 EXPERIENCE*			ATTAINED AGE GROUP	1956 EX- PERIENCE † MED. AND NONMED.
	Medical	Non- medical	Total		
20-29.....	62.2%	58.8%	61.3%	15-19.....	42.7%
30-39.....	81.9	64.5	80.1	20-24.....	53.7
40-49.....	73.9	40.6	72.5	25-29.....	60.2
50-59.....	49.9	.....	49.3	30-34.....	63.9
60-69.....	58.9	.....	59.3	35-44.....	58.5
				45-54.....	44.3
				55-64.....	41.2
				65-74.....	51.0
				75 and over..	62.8

\* Experience by amounts of issue years 1935, 1937, 1939, 1942 and 1944.

† Experience by policies of all premium paying standard Ordinary and Monthly Debit Ordinary.

1949, shown in the third column of Exhibit 8, is fairly close to the Prudential experience shown in the second column of Exhibit 7.

*Company D* separated by sex its general mortality study between anniversaries in 1941 and 1955. While the expected deaths were computed for individual policy years by Elston's table (*TASA XLVIII*, 242 and 248), thus recognizing the durational effect of selection, the tabulations submitted combined all policy durations in issue age and broad issue year groups. It was therefore not possible to show, in Exhibit 9 summarizing

EXHIBIT 9  
RATIOS OF FEMALE TO MALE RATIOS OF ACTUAL  
DEATHS\* TO EXPECTED BY ELSTON'S TABLE  
EXPERIENCE OF COMPANY D ON ISSUES OF  
1925-49 OBSERVED BETWEEN ANNIVERSARIES  
IN 1941 AND 1955

	Policies	Amounts
<i>Standard Non-medical</i>		
Issues 1925-39 . . . . .	56.7%	55.0%
1940-49 . . . . .	53.1	48.8
1925-49 . . . . .	55.1	52.0
<i>Other</i>		
Issues 1925-39 . . . . .	55.0	56.9
1940-49 . . . . .	54.1	52.5
1925-49 . . . . .	54.7	55.3
<i>Total</i>		
Issues 1925-39 . . . . .	55.3	56.7
1940-49 . . . . .	53.6	52.0
1925-49 . . . . .	54.9	54.9

\* Excluding war deaths.

this company's experience, any analysis by attained age. However, the over-all ratios for *Company D* are not greatly different from those shown for *Company A* in Exhibit 6.

*Company E* as well had separated by sex only a recent general mortality study—covering issues of 1933 and later to anniversaries in 1953—for which attained age analyses were not derivable from the data submitted. The over-all results, shown in Exhibit 10, tend toward a higher ratio of female to male mortality than in the other experiences reviewed, but this may be a matter of a comparatively large proportion of the over-all exposures occurring at the younger adult ages, where the ratios run highest in all the studies.

Notwithstanding the fact that the published Prudential experience has been shown above to be not typical in a detailed way of other companies'

Ordinary experience, it is so in an over-all way, and hence the financial effects on life insurance policies are of interest. To illustrate these effects, the portion of that experience (by amounts of insurance) relating to the sixth and later policy years was graduated and loaded by methods comparable to those used in constructing Table X<sub>17</sub>. In Exhibit 11, for the Whole Life and 20 Payment Life plans and female issue ages 20, 35 and 50, there are shown the issue ages for which the male net level premium and 5th, 10th and 20th year terminal reserves are equal to the corresponding functions for a female at the tabulated issue age. A similar calculation was made of the net level premiums on the 20 Year Endowment and 20 Year Term plans; for each of these two plans and the three issue age comparisons, the indicated "rating down" was greater than five years. Similar cal-

## EXHIBIT 10

RATIOS OF FEMALE TO MALE RATIOS OF  
ACTUAL DEATHS TO EXPECTED BY IN-  
TERCOMPANY RECENT ISSUES EXPERI-  
ENCE\*

EXPERIENCE OF COMPANY E ON STAND-  
ARD POLICIES ISSUED IN 1933 AND  
LATER TO ANNIVERSARIES IN 1953

	Policies	Amounts
Medical . . . . .	61.7%	87.4%
Nonmedical . . . . .	71.4	71.3
Total . . . . .	65.8%	84.4%

\* For the preceding year of experience.

culations for terminal reserves are not meaningful for these latter plans, because the terminal reserves for all issue ages merge into the uniform value of \$1,000 in the case of the endowment plan, and zero in the case of the term plan.

The amount of rating up in age required for males, and of rating down in age for females, from the experience combined by sex depends, of course, upon the proportion of the two sexes in the combination. For this particular Prudential mixture, the rating up required for males, from the issue age in the mortality table combined by sex, is never as great as 5/10ths of a year of age for any of the instances discussed in the preceding paragraph.

### *Proposed Studies*

While all of the studies reviewed above confirm the existence of lower mortality for females than for males the same age insured under Ordinary policies, they also exhibit the variations among companies whose possible



existence we sought to test when requesting these studies. To reduce variations of this type, which inevitably occur when the mortality experience of just a few companies is observed, the Society's Committee on Mortality under Ordinary Insurances and Annuities (and the corresponding joint committee of the Society's predecessor organizations) has been collecting and analyzing for some 20 years the combined experience of most of the large companies. Not only is this combined experience reliable because of

## EXHIBIT 11

AGE DIFFERENTIAL BETWEEN MALES AND FEMALES ON BASIS  
OF PRUDENTIAL 1948-52 EXPERIENCE\* AND 2½% INTEREST

	WHOLE LIFE		20 PAYMENT LIFE	
	Equivalent Male Issue Age	Differential	Equivalent Male Issue Age	Differential
<i>Female Age 20</i>				
Net Level Prem. ....		†		†
5th Year Term. Res..	15.69	4.31	15.30	4.70
10th Year Term. Res.	15.82	4.18	15.36	4.64
20th Year Term. Res.	15.67	4.33	15.23	4.77
<i>Female Age 35</i>				
Net Level Prem. ....	30.21	4.79	30.16	4.84
5th Year Term. Res..	30.34	4.66	30.26	4.74
10th Year Term. Res.	30.37	4.63	30.28	4.72
20th Year Term. Res.	31.05	3.95	30.60	4.40
<i>Female Age 50</i>				
Net Level Prem. ....	45.33	4.67		†
5th Year Term. Res..	47.25	2.75	46.51	3.49
10th Year Term. Res.	48.16	1.84	47.12	2.88
20th Year Term. Res.		Neg.	47.69	2.31

\* The data (by amounts of insurance) relating to the sixth and later policy years in E. A. Rode's paper in TSA V, graduated and loaded similarly to Table X17.

† More than five years.

its size, but its value as a tool of actuarial analysis is greatly enhanced by the uniform standards maintained by the Committee as to the nature and form of the data submitted by the individual contributing companies. In fact, it was primarily from this experience that the Society's Committee constructed Table X17.

At the suggestion of the undersigned Subcommittee, the Committee on Mortality under Ordinary Insurances and Annuities has undertaken to study mortality differential by sex underlying its continuous investigation of the mortality under Ordinary insurance within 15 policy years of issue. For the experience between 1955 and 1956 anniversaries, which will be

reported on in an early 1958 publication of the Society, about two-thirds of the contributing companies have found that they can separate their contributions by sex of the insured (in addition to the currently maintained separation between medical and nonmedical). In later studies, additional companies will probably find it possible to separate their contributions by the sex of the insured. Thus, continued study of this question by the Committee on Mortality under Ordinary Insurances and Annuities will make available pertinent data to the life insurance business from a group which is generally conceded to be the most reliable—from both the statistical and actuarial points of view—source of mortality experience under Ordinary life insurance in the United States.

### *Conclusions*

On the basis of the above, the Subcommittee is of the opinion that:

- (i) Each company must decide whether, and if so in which classes of policies, it is justified in offering policies to female risks at a premium rate lower than for a male the same age, on the basis of the distribution of its business by geographical subdivision, by economic class, and by the marital status of the females it insures, on the basis of the broadness or refinement of underwriting classification in the various classes of policies that it offers, and on the basis of the average size of policy and the relative importance of disability or retirement annuity benefits in these policy classes. If a company, after a review of its situation in these respects, decides to offer a class of policies to females at a lower rate than for males the same age, it could, of course, still compute nonforfeiture values and reserves on the basis of the true age of the female insured. Such a company could, on the other hand, decide to compute nonforfeiture values and reserves by using those for a male younger than the true age of the female insured. While the data available at the present time are not conclusive with respect to the maximum age differential that should be permitted, the studies reviewed above do indicate that nonforfeiture values and reserves would still be adequate if the differential used is 3 years of age.
- (ii) The interests of the actuarial profession and the life insurance business will best be served by a continuation of the studies of the differential between male and female mortality being conducted by the Society of Actuaries Committee on Mortality under Ordinary Insurances and Annuities, undertaken this year at the suggestion of this Subcommittee.

EDWARD A. LEW

JAMES T. PHILLIPS

BERT A. WINTER, *Subcommittee Chairman*

