DIGEST OF INFORMAL DISCUSSION

MORTALITY

A. To what extent has mortality improved over the last 20 years?

B. Have premiums on nonparticipating policies fully reflected the changes in mortality experience?

C. Should the new Mortality Table X_{17} be adopted for valuation purposes? Would significant changes in the incidence of policyholders' dividends result from the use of this table?

D. What have been the trends in extended term insurance mortality over the last 20 years? What is an appropriate basis for extended term insurance considering current mortality rates and the cost of administration?

E. Is it practical and desirable to adopt different valuation mortality tables for male and female insured lives? Are adequate data available for the derivation of a mortality table for female lives?

F. What evidence is available concerning the incidence of extra mortality on substandard lives at the very long policy durations? How do the results vary by age at issue?

MR. A. N. GUERTIN, speaking on section A, said the fact that mortality experience has been improving year after year is accepted by insurance men as a natural phenomenon. The magnitude of the improvement, however, has not been followed so closely. Since the middle of the 1930's which represents the midpoint of the experience underlying the CSO table, the death rate for white males at ages 20 to 45 has dropped by over 30%, and for females the reductions have been even more dramatic. Similarly, the improvement in insurance mortality experience during the past 15 years has been almost phenomenal. For policies in force for more than 5 years, the actual experience rates of mortality during the early 1950's as compared to the decade of the 1930's has dropped as much as 50% at age 30 running down to more than 20% at age 70. When these changes are compared with those developed in the previous 25 years as represented by the differences between the experience rates of the American Men Table and the experience rates used in the construction of the CSO table, we see that improvement has been taking place at an accelerated pace.

MR. E. A. LEW said there have been a number of significant changes in the death rates during the last 15 or 20 years. One is that the mortality of white males and that on Ordinary insurance has, during the past 5 years, decreased only to a slight extent, far less rapidly than it did in the

1940's. Another point is that the mortality of female lives over the longer period has declined very much more than that of male lives. Finally, it seems apparent that unless there are some sizable reductions in mortality in the near future from cardiovascular-renal diseases and cancer among the white males, there is little reason to expect the death rate of white males or that on Ordinary insurance to decrease significantly.

In the latest report on Mortality under Standard Ordinary Insurance Issues covering the period between 1954 and 1955 anniversaries, the most significant conclusion to be drawn is that the smallest decreases in mortality were experienced from 1951 to 1955. Specifically, at attained ages under 35, the greatest mortality improvement occurred from the period 1943–47 to the period 1947–51, and this improvement reflected in part the reduction in military accidents following demobilization, the development of antibiotics, improvement in surgery and the decline in tuberculosis. In the attained age group from 35 to 64, the greatest improvement in mortality took place in the period 1939–43 to the period 1943–47, attributed to antibiotics, safer surgery, better medical care. At attained ages 65 and over the mortality trends are not clear.

Broadly speaking, mortality on Ordinary medical issues in the first five policy years decreased by 20% to 30% from the period 1939–43 to the period 1951–55. Mortality in the 6th to 15th policy year durations improved by 25% to 35% at ages over 25 but less below age 25, perhaps because of the inclusion of fatal military service accidents incident to the mobilization and combat in the Korean War. For durations 16 and over, mortality at attained ages under 35 decreased about 40%, at attained ages 70 and over only about 15%.

Speaking on section B, MR. N. M. HUGHES commented that this question could not be given a yes or no answer because of the wide variation among companies. Fears had been expressed in certain quarters that premiums, particularly for the "specials," were getting dangerously low. He felt, on the contrary, that companies were retaining adequate safety margins. In this connection, he suggested that a gross premium could be considered adequate if it were based on X_{17} mortality, 3% interest, a typical commission scale, and a reasonable provision for expenses. Most of the premiums for "specials" seemed to fulfill this test.

Mr. Hughes indicated that the deficiency reserve requirement exercised such a control on nonparticipating premiums that many companies could not afford to give full effect to the change in mortality experience. In his opinion, the deficiency reserve requirement was an indirect and unfair system of rate control.

Mr. Hughes then traced the average nonparticipating premium pat-

tern of the past twenty years. During the period 1936–1951, rates increased substantially on Ordinary Life, and very greatly on higher premium forms. This was a period of declining mortality but also of declining interest. Since 1951, Ordinary Life rates have pretty much returned to the 1936 level, but this has not been true of plans with a larger investment element. Evidently, he said, the companies have shown greater confidence that mortality will continue to be favorable than that the recently improved levels of interest will prove permanent.

MR. R. A. LEGGETT mentioned that the Travelers revised its Ordinary rates in 1953 and used a modification of the 1946–1949 intercompany experience. In future revisions, he thought his company would follow intercompany data. His company's procedure, he said, produces two mortality profits, one from the fact that the mortality experience underlying the rates is 5 to 10 years old at issue and the other from the improvement in mortality expected during the lifetime of this business. Mr. Leggett added that on occasion CSO net premiums are used in his company to avoid the bother of many small deficiency reserves, but when the difference between gross and net rates is great, deficiency reserves are set up. For certain plans these deficiencies are kept at a low level by raising the valuation interest rate which in turn reduces the net premiums.

Mr. Leggett felt that many companies are not reflecting the improvement in mortality for retirement income policies. His company determines maturity cash values as the present value of the life income on the 1937 Standard Annuity Table set back three years with $2\frac{1}{2}\%$ interest. He added that for annuities to begin in 25 years these values are probably too low but his company adopted them for competitive reasons. Mr. Leggett mentioned that, as an unhappy compromise, those retirement income policies issued at younger ages with inadequate maturity values have a pure endowment type factor added to the premium to produce the extra cash needed at maturity to provide the life income.

MR. R. M. SELLERS said that the 1952 Commonwealth Life nonparticipating premium rate revision reflected that company's own experience for the years 1948–1951 inclusive. Thus, when the premium rates were computed, they did fully reflect current mortality experience. He then presented the mortality ratios experienced by his company in more recent years as a percentage of their 1948–1951 experience.

1948–1951	100%
1952	127%
1953	103%
1954	93%
1955	78%
1956	82%

Since his company's experience has improved very rapidly, he pointed out that a rate book must be very recent indeed to reflect current mortality experience. He also stated that Commonwealth's experience for the years 1948 to 1951, inclusive, was 94.9% of Table X_{18}.

Speaking on the first portion of section C, MR. A. N. GUERTIN said that when the CSO table was adopted few thought that the mortality improvement would be so rapid that the new table would itself be obsolete in 10 years. However, the gross premiums currently being charged for nonparticipating policies are often less than the net CSO premiums at the same interest rate. To relieve the nonparticipating companies of the impact of deficiency reserves it was decided that perhaps the most practical way to solve the problem would be to obtain authorization on a permissive basis for the use of a new mortality table.

This new mortality table was designed primarily for use as a permissive valuation basis. Yet the other uses the table would be put to had to be considered and also the needs of the companies, participating and nonparticipating, had to be recognized.

Mr. Guertin then presented the summary of the amendment to the Standard Nonforfeiture and Valuation laws as proposed by the subcommittee appointed by the National Association of Insurance Commissioners.

(1) Naming Table X_{17} as the "Commissioners Approved Standard Ordinary Mortality Table."
(2) Optional use of the new table for the calculation of minimum nonforfeiture benefits for ordinary policies.
(3) Continued authorizing of the use of 130% mortality for the calculation of extended insurance.
(4) Optional use of the table for the valuation of ordinary policies.
(5) Establishing minimum aggregate reserve for any category of policy as the aggregate value of nonforfeiture benefits on the valuation date.
(6) Permitting three-year setback for the calculation of reserves and nonforfeiture benefits in the case of females.

Among many other criteria, the new table, in order to be practical of adoption, had to have rates of mortality sufficiently low to produce net premiums which would be below the gross premiums currently charged by well-managed nonparticipating companies. Table X_{17} fulfills this requirement everywhere except in reinsurance premiums.

A comparison of the net premiums at $2\frac{1}{2}\%$ on Table X_{17} with the gross annual premiums charged by a number of large stock companies on their nonparticipating business shows that the excess of the lowest of the gross premiums over Table X_{17} is relatively small. At age 25 it runs only about $1 and at age 55 about $2. These examples indicated to Mr. Guertin that

since the gross premiums quoted presumably contain some margin for expense, companies do not expect to experience mortality as high as that contained in Table X_{17}. This is no proof of the adequacy of the margins in Table X_{17}, yet it is illustrative of opinions as to the levels and trends in insurance mortality. Mr. Guertin compared the margins in Table X_{17} and the CSO table in relation to their respective basic experiences (see Table 1).

TABLE 1

PERCENTAGE MARGINS IN TABLE X_{17} AND
CSO OVER THEIR BASIC EXPERI-
ENCE TABLES

Age	Table X_{17}	CSO
7................	55.8%	50.6%
17................	86.6	77.2
27................	69.4	62.0
37................	52.4	41.9
47................	22.0	26.1
57................	15.0	16.5
67................	15.0	11.3
77................	15.0	8.8
87................	15.0	8.1

TABLE 2

Age	Table X_{17}	U.S. White Males 1949-51	"Lowest" Premium
20..............	$10.54	$11.06	$11.49
35..............	17.48	18.56*	18.89
50..............	32.20	34.06	34.09

* Estimated.

Mr. Guertin also compared insurance mortality with population mortality and computed $2\frac{1}{2}\%$ Ordinary Life premiums on Table X_{17} and on the United States White Males 1949–1951 Table and compared them with the "lowest" gross premium now being charged for nonparticipating insurance. It is interesting to note that these "lowest" premiums very closely parallel those derived from the population data (see Table 2).

These considerations indicated to Mr. Guertin that greater margins could not be justified. His conclusion was that the CSO table is no longer sufficiently representative to be continued indefinitely and that a new table is indicated.

MR. A. L. MAYERSON, speaking on the first portion of section C, said that the CSO table is too conservative for present-day conditions and should be superseded as a valuation standard. The experience underlying the CSO table is over 20 years old and mortality has improved so greatly since World War II that companies today have average mortality only 60% of CSO. Mr. Mayerson pointed out that in theory the valuation mortality table has no direct influence on the cost of life insurance since the cost actually depends on the gross premium rate, the dividend level, the interest and expense rates and the actual mortality experienced. However, he said it has an indirect influence especially on equity between various plans and ages. In nonparticipating life insurance the deficiency reserve requirement may prevent a company from lowering rates as much as desired.

The continued use of the CSO table might lead some people to believe that insurance companies are not being fair to the public. (Mr. Guertin also commented on this point.) It is a fact that the mortality rates in the CSO table are generally much higher than the rates in the 1949–1951 U.S. population tables. Table X_{17} is below the 1949–1951 U.S. White Males Table at almost all ages—which should improve the public relations problem in this area, at least for a while.

Table X_{17} was designed to solve the problem of deficiency reserves on the part of nonparticipating companies. However, Mr. Mayerson feels that even if there were no problem with deficiency reserves, the CSO table should be abandoned. He said that if a deficiency reserve requirement were based on reasonable mortality and interest it might serve a useful purpose. But much better protection, he felt, is that provided in the self-supporting provision of Section 213, subsection 10, of the New York law. This section states:

No such company shall issue any life insurance or annuity contract which shall not appear to be self-supporting on reasonable assumptions as to interest, mortality and expense.

This provision, he thought, was much more effective than a deficiency reserve requirement since it considers expense in addition to interest and mortality. Perhaps consideration should be given to requiring deficiency reserves only when the gross premium is less than the net premium on the minimum valuation standard rather than on the valuation standard actually used by the company. This would mean that companies strengthening their reserves would not be penalized.

Mr. Mayerson felt that perhaps logically a new table should be adopted on a mandatory rather than a permissive basis. He noted the history

of the previous valuation standards and pointed out that actuaries have always preferred that changes be optional rather than compulsory. However, he said, certain state insurance laws do not agree with this philosophy for they seem to require a mandatory valuation standard as, for example, Section 205, subsection 3(a) of the New York Insurance Law. He pointed out, however, that this law sets a minimum valuation standard and so companies are free to use tables which produce higher reserves than the minimum. Since the CSO table produces higher reserves generally than Table X_{17}, companies would presumably be free to continue to use the CSO table for reserves. While Mr. Mayerson thought it desirable to have the new table become the valuation standard in place of the CSO table he was not sure whether this could best be achieved by making it mandatory or by making it permissive and trusting to competition to secure its eventual adoption. The principal argument against making the new table mandatory is the substantial cost involved in reprinting forms and rate books. However, if a number of years are allowed for the change-over the cost may not be a major obstacle.

Mr. Mayerson next discussed the question of whether the new table should apply to nonforfeiture values as well as to reserves. Actually there is no reason why reserves and nonforfeiture values must be calculated on the same table at the same interest rate. However, separate bases for nonforfeiture values and reserves can be permitted only at the cost of the Insurance Department's relinquishing a substantial portion of its supervision over surrender values. Thus, adequacy and reasonableness of surrender values would depend exclusively on a company's internal asset share calculations. This would prevent effective control. He said that the new table should apply to nonforfeiture values as well as to reserves in order to insure equity between persisting and withdrawing policyholders.

Turning next to the nonforfeiture options, he believed that it might be necessary to abandon the statutory requirement that extended term and reduced paid-up be equivalent to the cash value at net rates. There must be provision for the expense of maintaining a policy in force under the nonforfeiture options. Up to now the expense had been covered by the redundant mortality rates of the table used to calculate nonforfeiture values but with a mortality table as close to actual experience as the X_{17} he felt there will probably be insufficient margin for expense. Unless the requirement that nonforfeiture benefits be provided at net rates is changed, companies may lose every time an insurance benefit is elected in lieu of the cash value. There seems to be a good deal of confusion as to the precise amount of antiselection under the extended term option but

with the new table much longer extended term periods will ensue. The accompanying tabulation indicates the extent of the increase on an ordinary life policy surrendered after ten years, assuming $2\frac{1}{2}\%$ interest.

TABLE	ISSUE AGE 20	ISSUE AGE 35	ISSUE AGE 50
American Experience.	12 years 176 days	13 years 180 days	9 years 29 days
CSO	23 years 101 days	15 years 251 days	9 years 27 days
X_{17}	29 years 119 days	19 years 101 days	10 years 235 days
PERCENT INCREASE			
CSO over Amer. Exp.	86%	16%	0%
X_{17} over CSO	26	23	17

Mr. Mayerson predicted that if Table X_{17} is adopted for nonforfeiture benefits most companies will use 130% of tabular mortality in calculating extended term insurance. He was rather dubious, however, about the validity of the 130% figure in measuring excess mortality on extended term insurance.

MR. M. R. CUETO stated that, in order to determine the effect of Table X_{17} on reserves, the New York Life took a block of business repre-

TABLE 1

Plan	Ratio of X_{17} Reserves to CSO Reserves
Ordinary Life	96.7%
10 Payment Life	95.0
20 Payment Life	94.4
30 Payment Life	95.3
Life Paid-up at Age 65	96.3
Life Paid-up at Age 85	95.5
Life Paid-up	96.1
Total Life Plans	96.2
20 Year Endowment	100.8
30 Year Endowment	101.6
Endowment at Age 65	99.3
Endowment at Age 85	98.0
Total Endowment Plans	99.9
Total	96.7

senting 85% of the reserves as of the end of 1956, in the amount of over three billion dollars. Then traditional net level premium $2\frac{1}{2}\%$ mean reserve factors at individual ages and durations were computed. These were summed to produce the total reserve on Table X_{17} and the CSO

Table. The total reserve was 3.3% lower on Table X_{17} than on CSO, reserves on life plans averaging 3.8% lower than on CSO and on endowments, .1% lower (see Table 1).

It is evident from Table 2, he said, that the shorter the duration the lower the ratio of X_{17} reserve to CSO reserve.

Mr. Cueto said his company believes Table X_{17} is a reasonable upgrading of the CSO Table. He added that Table X_{17} should be on a permissive

TABLE 2

Mean Duration at December 31, 1956	Ratio of X_{17} Reserves to CSO Reserves
1.	90.8%
2.	93.4
3.	94.5
4.	95.8
5.	96.0
6–10.	96.7
11–15.	97.1
16–20.	96.7
21–25.	97.3
26 & over	97.6
Total	96.9

basis and said that on the basis of his calculations, as shown above, a mutual company would not have any serious problem in adopting Table X_{17} as a valuation standard. Mr. Cueto also gave a summary of the calculation procedures necessary to derive the figures above as performed on the IBM 705 electronic computer system.

In discussing section C, MR. W. H. BITTEL first briefly reviewed the current status of the new mortality table from the standpoint of the National Association of Insurance Commissioners. The Subcommittee on Deficiency Reserves reported to its parent committee at the Commissioners' meeting last December. This report contained the recommendations which he mentioned during the panel discussion last October and, in addition, specific amendments to the Standard Nonforfeiture and Valuation Laws to carry out these objectives. Discussion of the report brought out the following: opposition to the inclusion of the year 1956 in the proposed name of the table, some sentiment for the setting of a mandatory operative date for all companies and considerable opposition by representatives of smaller companies to any change at this time. These developments permitted a small group of Commissioners, who were seeking to delay favorable action on the report, to achieve their objective by parliamentary maneuvering. The net effect was the deferment of action

thereon although there was not any actual vote by the Association on the merits of the proposal.

Legislation has been introduced in at least one state, New Jersey, to authorize the use of Table X_{17} as a permissive valuation standard. This bill includes all of the recommendations of the Subcommittee on Deficiency Reserves and actually contains the l_x column of the table because of the failure of the Commissioners to give the table an official name. A substitute name, the Commissioners Approved Standard Ordinary Mortality Table, was agreed upon at the Commissioners' meeting although since then representatives of one company have objected to that name also. This substitute name, with the word "Commissioners" omitted, appears in the New Jersey bill. This bill has been recommended by the New Jersey Commissioner for enactment because that department feels that this table is a safe and proper basis for the valuation of policy liabilities of a life insurance company.

To Mr. Bittel it seemed rather unusual that the opposition to this new table as being unsafe comes from certain segments of Industry rather than from those connected with Insurance Departments, and even more surprising that some actuaries again seem to feel that all of the hazards and problems in the operations of a life insurance company can be eliminated or at least greatly reduced if only we keep a statutory mortality table which has excessive mortality margins over and above current experience. These are the same arguments which he recalled as being advanced when the American Men Table and the CSO Table were proposed for valuation purposes. Perhaps it is just human nature to want to continue to have excessive margins in a valuation table when this condition produces desirable results in other areas, such as competition between companies. However, it would be prudent to consider carefully the implications in the dire predictions of the effect of the adoption of this table for valuation purposes on this competitive situation. If there is need for the regulation of premium rates for individual policies of life insurance, this should and can be done directly through the enactment of the necessary regulatory statutes. The only essential function of a proper mortality table for valuation purposes is to provide as closely as possible the amounts needed to pay death claims when deaths occur. In the opinion of those who prepared it, Table X_{17} does this. It is in the public interest to have this table as a permissive standard.

In conclusion, he thought all of those who had a part in the preparation of this table would be much interested in specific information from those who feel this table is not conservative enough for valuation purposes as to just what margins should be added to the basic table to make it suffi-

ciently conservative for their purposes. Would they recommend loadings which would produce net premiums higher than gross premiums actually being charged by well-managed and conservative companies today? Would the fact that current gross reinsurance yearly renewable term premiums at many ages are lower than the net premiums on Table X_{17} have any significance? It is true that these reinsurance premiums are not guaranteed; but is it reasonable to assume that such companies would permit their clients to rely on such a pattern of reinsurance rates unless they felt these rates could be continued for some time? Another important factor which must be carefully considered is that arbitrary and unreasonably high loadings would distort the minimum nonforfeiture benefits required by law and would thus produce inequities. Mr. Bittel stated that when one struggles with the pros and cons of the great variety of problems today, he eventually begins to wonder whether our thinking processes and particularly our acceptance of new concepts and tables have kept pace with the kind of results which can now be obtained through the use of modern electronic equipment such as the IBM 705 System.

MR. V. E. HENNINGSEN said that the answer to the first part of section C hinges on whether the table is to be permissive or mandatory. Mr. Henningsen wanted to know whether the approach to a new mortality table did not concern itself too much with the deficiency reserve problem and too little with the necessity of producing mortality margins large enough for dividend purposes.

MR. A. N. GUERTIN, speaking with reference to the second part of section C, said that the committee was urged to widen the mortality margins as much as possible, bearing in mind the needs of mutual companies issuing participating policies. He said that mutual companies had traditionally used mortality tables with wide margins with the view that large mortality gains would be produced and that this in turn would result in substantial dividends. However, he pointed out that the American Experience Table was criticized in the late 1930's because it threw up substantial mortality margins at the younger ages in comparison to those at the later ages so that with the declining interest rates it was almost impossible to develop a dividend scale in which dividends increased with age. The margins in Table X_{17} are such that a situation as described above is not likely to occur even if interest rates again decline substantially. However, the margins seem to be large enough in Table X_{17} to develop mortality factors of significant size for dividend purposes.

MR. A. L. MAYERSON wondered whether the effect of a new table on participating business could be dismissed lightly. He pointed out that

many mutual companies adopt the valuation table as the basis for calculating premiums just for reasons of convenience. He said that with a lower valuation table a mutual company might actually lower its gross manual premiums somewhat. Mr. Mayerson said he realized that lower gross premiums would not affect the cost of insurance on participating policies if dividends were equitably distributed.

However, he said, many companies go to great lengths to maintain an equitable dividend scale while others do not. On the basis of his experience with the New York Insurance Department he said that the dividend distribution system of several companies did not, in his opinion, distribute earnings in accordance with the source of those earnings. Part of the trouble was due to the fact, as Mr. Guertin described earlier, that with the American Experience Table as the premium basis a completely equitable dividend scale might have been a decreasing one. Whatever the reason, there were companies which, as late as 1953, used the CSO unloaded table as the basis of "actual" mortality in their dividend scales. The use of Table X_{17} for valuation and for the calculation of participating premiums cannot make it more difficult for the actuary to maintain equity between plans and ages in the dividend scale and may make it easier for him to do so.

MR. H. A. GARABEDIAN described the dividend approach of his company, which is a conventional three factor system, with the mortality contribution determined by attained age and by direct reference to the excesses of the tabular CSO rates over the John Hancock ultimate experience. Then he substituted Table X_{17} for the CSO Table and found that the ratio of actual to expected on such table, for standard experience, durations 16 and over, from ages 50 to 70 lies in the range of 95% to 98%. He pointed out that from ages 50 to 70 there is a good deal of 6th through 15th year select data in Table X_{17} and asked why these were included in an ultimate table.

Mr. Garabedian said that the basic question raised is whether or not a mortality table satisfactory for valuation purposes should be based on truly ultimate experience, rather than upon an aggregate experience which excludes only the first 5 policy years, which by the evidence can no longer be assumed to represent a complete select period. Whatever the answer to this question, a more truly ultimate table would greatly minimize the John Hancock's dividend problem.

MR. M. R. CUETO, answering the second portion of section C, felt that there would be little change in the dividend pattern inasmuch as dividends depend on the excess of the premium over a company's actual

experience. However, the use of this new table may produce higher dividends. With different reserves the pattern of terminal dividends may also change.

MR. W. H. BITTEL, speaking also with respect to dividends, brought up a subject which was the cause of some of the confusion in connection with this project at the recent Commissioners' meeting. The report of the Subcommittee on Deficiency Reserves did not recommend any mandatory operative date for the new permissive mortality table. Representatives of an important state insisted that such a date would have to be included because they were satisfied that there would be significant changes in dividends to policyholders at many ages and durations as a result of the adoption of the new table. This conclusion was not based upon any study nor was any evidence available that a single company was ignoring current mortality experience in the distribution of surplus earnings. It was not clear to him whether or not the specific question under discussion as to significant changes in the incidence of dividends covered these same phases of dividend distribution. In any event, it would be very desirable for all companies to reexamine their current dividend schedules to satisfy themselves that adequate recognition is being given to current mortality experience in the distribution of excess earnings. Many of us could recall instances, especially in connection with renewable term insurance, where rather drastic changes in dividend schedules had to be made by many companies, after the CSO Table became mandatory, to correct serious inequities as between old and new policyholders. While it seemed unlikely that there could be any comparable situations today, it was only fair to point out that even a single instance of this kind could bring about a demand that it is in the public interest to require all companies to use the new mortality table as the basis for nonforfeiture benefits and reserves by some specific date. The report of the Subcommittee on Deficiency Reserves was modified to meet the objections of this state and, as finally presented, contained the following statement: "It is the intention of this committee to continue its studies of the problem and to make a further recommendation at the June 1957 annual meeting of the NAIC as to a proposed mandatory effective date." His personal view is that there is no need at this time for making the use of the new table compulsory by any specific date. No such date is included in the New Jersey Bill which he had previously referred to.

With regard to the second portion of section C, MR. V. E. HENNINGSEN felt that mortality refunds would have to be substantially reduced. The net payments would not necessarily be changed but cer-

tainly the incidence of dividend would be reduced because the mortality refunds would be so substantially affected by this new table.

MR. M. H. BEACH, discussing section D, presented the extended term experience of the Travelers on issues of 1931 and later exposed from 1940 to 1955. Tabular deaths were computed on Table X_{17} and on the CSO Table. All deaths within 90 days of lapse were omitted to adjust for the usual understatement of extended term exposure. This, however, produced results which do not reflect the high mortality which might be expected during the first three months after lapse. This adjustment reduced the over-all mortality ratios for the 1940–1955 period over 8% by number and 12% by amount. The experience was divided into three five-year exposure periods to see if there were any trends (Table 1).

Claims for the entire 15-year exposure period equaled 61.7% of CSO with very little variation between the three five-year periods. The corresponding ratios on Tables X_{17} and X_{18} were 97.7% and 122.2%, respectively. Mr. Beach pointed out that of the three exposure periods, that for 1950 through 1955 gave the best indication of the current level of their extended term mortality. Besides being their latest experience, it reflected a more typical distribution of businesss between select and ultimate policy years than either of the earlier periods covered. Ratios to X_{17} for 1950–1955 by number were less than by amount at all ages and only for ages above 60 did the amount ratio exceed 100%. He said that the Travelers experience paralleled that of the industry by having the mortality by amount greater than that by number and by having the most unfavorable experience centered at the higher ages. He also remarked that his company's extended term mortality rates did not seem to have improved during the 15-year period. This may in part be explained by the fact that the earlier exposure years had more select data and less of the unfavorable age 60 and older experience. He added that starting in 1951 a substantial portion of Travelers business has automatic premium loan rather than extended term as the automatic option. It seems, he said, that when premium loan is the automatic option, mortality ratios on extended term are higher than when extended term is the automatic option. He felt that perhaps there was an actual improvement in Travelers experience which was offset by these other factors just mentioned.

Turning to the other portion of the question, Mr. Beach estimated expenses on extended term policies at $0.15 per thousand per year excluding claim expense. Total claim expenses, including claim administration, should not add more than the equivalent of 3% higher mortality, he felt.

Based on Travelers' limited experience, Mr. Beach suggested that

TABLE 1

THE TRAVELERS EXPERIENCE UNDER EXTENDED TERM INSURANCE
(WAR DEATHS INCLUDED)

STANDARD ISSUES 1931–1954

ATTAINED AGE GROUP	ACTUAL DEATHS		RATIO TO 1941 CSO		RATIO TO X_{17}	
	Number	Amount	Number	Amount	Number	Amount
Experience 1940–1945						
Under 40......	24	$ 43,900	54.2%	54.0%	106.7%	106.8%
40–49.........	12	48,200	33.6	45.9	57.1	78.6
50–59.........	18	71,100	70.3	81.6	102.9	119.5
60 and over....	3	8,100	....	....	....	....
All........	57	$ 171,300	49.1%	56.7%	82.3%	92.7%
Experience 1945–1950						
Under 40......	24	$ 47,100	46.9%	46.5%	92.7%	92.4%
40–49.........	26	75,800	47.2	48.8	82.3	83.4
50–59.........	28	115,700	69.5	86.4	101.4	126.6
60 and over....	13	64,500	67.4	95.6	84.4	120.8
All........	91	$ 303,100	54.9%	66.2%	90.5%	105.7%
Experience 1950–1955						
Under 40......	30	$ 71,600	43.1%	43.0%	85.5%	85.3%
40–49.........	54	136,600	55.7	45.8	94.6	78.0
50–59.........	47	197,700	·55.9	68.7	81.5	100.3
60 and over....	34	152,500	76.2	94.0	95.5	117.9
All........	165	$ 558,400	55.9%	61.0%	88.9%	95.4%
Experience 1940–1955						
Under 40......	78	$ 162,600	47.2%	46.6%	93.4%	92.4%
40–49.........	92	260,600	49.0	46.7	83.9	79.6
50–59.........	93	384,500	62.0	75.6	90.5	110.5
60 and over....	50	225,100	67.3	87.0	84.3	109.5
All........	313	$1,032,800	54.2%	61.7%	88.1%	97.7%

Table X_{17}, with a loading graded up to 25% for ages above 60, should be adequate to cover mortality and expenses. However, he pointed out that their experience has in the past appeared to be more favorable than that of some other companies and a greater amount of the poorer automatic premium loan experience is appearing on his company's books with its correspondingly poorer experience.

Speaking on the first portion of section E, MR. A. N. GUERTIN said that one of the questions which arose before his committee and before the NAIC was that of the relative improvement and the current mortality differences between men and women. This question arose for several reasons. One is the divergent trend in population mortality, where the female death rate is less than half that of the male below age 45 and less than 60% at age 45 and above. Another reason is that a few companies are rating down females three or four years in certain of their policies. Mr. Guertin said it was clearly evident that the time had not come to recommend different tables for men and women but it was evident that there should be more adequate knowledge of insurance mortality by sex. Accordingly the Committee on Ordinary Mortality has been asked to consider the development of mortality statistics differentiated by sex.

MR. A. T. BUNYAN said that in the past insurance companies charged the same rate for males and females despite the better female mortality. They did this because of the small average size of female policies. However, with new minimum size policies and with the grading of premium rates by size, separate rates became possible. He said that a separate valuation table was impracticable because of the many problems which would arise, including the development of new dividends, reserves, values and rates. Mr. Bunyan indicated that rating down the ages was the only practical solution inasmuch as it adds little to the expense and can be put into practice by a simple announcement. He added that the rating down in age of a single table was working satisfactorily in annuities and could work out just as well in life insurance.

MR. G. H. DAVIS said he assumed that the question is not whether it is practical at present to adopt different valuation mortality tables for male and female insured lives, because in his opinion no such suitable valuation table exists. There are separate tables based on population data but he thought it fairly evident that none of them could be considered suitable for insurance valuation purposes.

If a suitable valuation table for females existed and were used with insurance on male lives still valued on the CSO Table, there would be some difficulties in connection with complying with minimum statutory

valuation requirements. Probably the female table would produce generally lower reserves than the CSO Table. If both male and female nonforfeiture values were calculated on the CSO Table, aggregate reserves for both sexes would have to be at least equal to reserves according to the Commissioners Reserve Valuation method on the CSO Table at the interest rate used in calculating nonforfeiture values. A company using the Commissioners method might not be able to meet this test, but a company using net level premium reserves could probably do so. There is a question as to whether the aggregate reserves on female policies ought not to be required to be at least equal to aggregate cash values, and meeting this test might involve further difficulty. The current Standard Nonforfeiture Law practically compels nonforfeiture values to be based on the CSO Table.

Although these difficulties are of some consequence they probably would not prevent the use of a different mortality table for valuation on female lives. If the valuation and nonforfeiture laws in the various states are amended to permit the use of a modern mortality table the same difficulties would exist. A question would arise, assuming the new table to be one based on total lives, as to whether a separate table should not also be used for male lives. Using two tables, both different from the statutory standard, would increase the difficulty of complying with the statutory minimum. Mr. Davis thought that this practical difficulty was enough and that there will be little tendency to change to the use of separate valuation tables unless the valuation laws are changed to permit this specifically. The nonforfeiture laws should also be changed because although the standard laws were intended to divorce valuation and nonforfeiture values, they still impose obstacles against using different mortality tables in valuation and in the calculation of nonforfeiture values.

Mr. Davis said that he understands the question to really mean whether it is desirable to use separate tables without consideration of any obstacles in existing laws. But any such obstacles seem to be of consequence in discussing whether the change is practical. If it is assumed that laws are to be amended to remove any obstacles, he thought the desirability of using separate tables depends upon whether different premium rates are used for males and females. One could argue that the difference between male and female mortality calls for the use of separate valuation tables regardless of the premium rates, but Mr. Davis thought that the circumstances do not justify changing from a valuation table based on total lives. If there is differentiation in premium rates he thought that there is at least some reason for using separate valuation tables and a somewhat stronger reason

for using separate tables for nonforfeiture values. If the latter were adopted, this would be another reason for making the change in valuation.

MR. B. A. WINTER said that, from population data and from the published experience of certain individual companies, we have been aware for some time that some differential existed in the mortality of male and female insured lives. At the same time it was observed that the average amount on the life of a female generally tended to be lower than that on the life of a male insured at the same issue age. The net effect of these two contrary influences was such that it was a nearly unanimous professional opinion that equity was best achieved practically by charging rates and allowing values that made no distinction by sex for life insurance policies, as distinguished from annuity contracts and those endowment policies where a life income is the preponderant benefit. This is particularly true of life policies containing automatic premium waiver disability benefits for which experience indicates that the female claim cost is somewhat higher than that for males.

The theoretical annual premium charge per thousand dollars of insurance for "per policy" expense is, of course, a harmonic function of policy size, Mr. Winter said, and so the effect on the theoretical premium charge is greatest where the policy is small. In other words, if the same rate of annual expense "per policy" applies to all policies greater than $1,000, the excess of the theoretical premium charge per thousand for this element for a $2,000 policy over that for a $3,000 policy is more than the excess of this charge for a $6,000 policy over that for any other policy, no matter how large. Thus, even under today's conditions, it may still be the fairest thing to charge males and females the same rate when insured for policies for a modest amount—say under $5,000. When the premium rate is not uniform per thousand of insurance but is calculated on a policy fee basis or when we are dealing with special large minimum amount policies, the offsets to the female mortality advantage are less significant and consideration has to be given to whether the premium rate for females should be lower, and for males higher, than the rate that otherwise would be charged both sexes for such a policy. As to gross premiums, Mr. Winter said, it seems there is only an extremely limited portion of the total range of policy issue where premium differential by sex is likely to be widely adopted. Moreover, preliminary calculations on the data available indicate that net level reserves computed on the mortality of female insured lives, while generally lower than those on the corresponding mixed lives, are lower by only a small percentage of the mixed life reserves. This indicated to Mr. Winter that doubling the number of valuation schedules presently re-

quired in order to apply valuation factors differentiating by sex is hardly worth while.

Naturally, when a company feels justified in offering a policy to females at a rated-down age it seems reasonable that the values required for that policy be computed at the rated-down age. In this situation it is obviously efficient to include females at the rated-down age in making up common valuation schedules. This process is facilitated if minimum valuation requirements recognize this possibility.

MR. E. A. LEW said that the Metropolitan experience by sex on standard Ordinary insurance shows that the female mortality has declined considerably more than that of the male in the last twenty years. This is in accord with similar mortality trends in the general population. This experience indicates male mortality under standard Ordinary policies has declined about 30% at ages 15 to 19, about 40% at ages 20 to 24, about 20% at ages 45 to 54 but only 15% at ages 55 and over. By way of contrast, female mortality has during the same time decreased about 50% at attained ages 15 through 19, about 60% at ages 20 to 44, about 50% at ages 45 to 64 and about 40% at ages 65 and over.

During the past fifteen years the mortality improvement for males and females below age 15 has been roughly the same, but in the broad age range from 15 to 74 the mortality of white females has declined by thirty to fifteen percentage points more than has the mortality of white males. The largest decline in white male mortality occurred at ages 1 to 14 while the largest decline in female mortality occurred at ages 1 through 34 despite the increased birth rate. There are clear indications that the mortality of white males has decreased only to a very small extent during the past five years.

An analysis of general population mortality by cause indicates that female mortality from cardiovascular-renal disease has declined consistently at all ages during the past 15 years, whereas male mortality from this important aggregation of causes of death has increased by 10% in the age range 45 to 64 and has remained about the same at ages 35 to 44. The higher mortality of white males from the cardiovascular-renal diseases is responsible for most of the current mortality differential between white males and white females at ages 35 and over. Also significant is the fact that mortality from cancer and allied conditions among white females, ages 25 and over, has decreased more than 10% whereas it has increased by more than 10% among white males. The main reason for this divergent trend lies in the continued rise of the death rate from lung cancer among males. So long as there is no significant reduction in the mortality

from cardiovascular-renal diseases or cancer among white males there is little reason to expect the mortality of white males to decrease appreciably in the near future.

MR. B. A. WINTER, speaking on the second part of section E, said that there are in existence a series of population mortality tables based on the United States white females. Along with the mortality tables themselves are commutation columns at various rates of interest for this same experience. Also included are abridged life tables based on the experience in more recent individual calendar years. These data indicate a substantial and, if anything, increasing differential in the mortality of white males and white females of the same age. Other population reports indicate a differential in female mortality by marital status—that is, single, married, widowed or divorced—which is often as large although not nearly so uniform as the differential between white males and the average of all white females.

Similar data differentiated by sex but not by marital status had been published by the Metropolitan Life Insurance Company from time to time based on their experience with lives covered for Industrial insurance.

While data of this kind indicate the probable existence of a sex differential in mortality, they 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 huge collection of Ordinary data, such as that of the Society's Committee on Mortality under Ordinary Insurance, had 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 were below, and those of the male section above, the average of the unknown mixture.

(2) The Ordinary underwriting procedures—in selecting females by their marital status at issue and eliminating from the standard group the males in hazardous occupations and risks with medical impairments at issue—may produce a mortality differential by sex different from that among the population generally, or among Industrial policyholders who are subject to much less severe selection than applicants for standard Ordinary insurance.

A few companies have made Ordinary mortality studies differentiated by sex and have furnished them to the subcommittee which Mr. Winter heads. Mr. Winter added that he would be very glad to have for study any other company's experience relating to this matter. The Committee on Mortality under Ordinary Issues has asked the contributing companies to

examine the possibility of splitting a company's contribution to the inter-company study by sex in addition to the subdivisions now made. It is clear, he said, that splitting the deaths by sex is not a difficult task but splitting the exposures is a tremendous job. Companies which wish to make a contribution in the near future will have to split their exposures by sampling or other approximate methods. However, those companies which are in the process of converting their own mortality records to magnetic tape may find it relatively economical to incorporate the coding necessary to the split as part of the conversion process. Even if the immediate results from the committee activity are scanty or approximate, it will make possible a valuable contribution to the ultimate knowledge of the profession if the contributing companies plan this coding into the magnetic tape procedures to which many of them will be converting in the next few years.