1952 REPORT ON ORDINARY DISABILITY BENEFITS

A. What period or combination of periods could reliably be used for valuation purposes? What is the effect of the elimination of the third period data from the study of disability rates and not from the study of disabled life annuities?

B. 1. Which of benefit bases 1, 2, 3 or 4 of the report could be most appropriately adjusted to the valuation of contracts providing for disability income payments based upon a six months waiting period? Has anyone made a study of their experience under the six months disability clause?

   2. Should allowance be made for the fact that the experience under the income benefits is generally at the longer durations since issue?

C. 1. Is the practice of applying the rate of disability to mixed lives in the construction of monetary tables, which was introduced following the appearance of the 1926 disability report, appropriate in connection with the new report?

   2. Is it practical to use a single decrement disablement table for the period preceding disablement in constructing monetary tables, or, putting it another way, is it particularly helpful to include any mortality at all prior to disablement in the construction of monetary tables?

   3. Is the lapse decrement enough more important than the mortality decrement to warrant its consideration in the checking of the adequacy of premiums?

D. What problems arise from the use of the assumed date at commencement of disability (date of disablement) as contrasted with the use of the date at the end of the waiting period (date of disability)?

MR. L. H. McVITY, speaking on section A, stated that the progressive decrease in rates of disablement over the periods covered in the report would indicate that no one of the periods is entirely suitable as a valuation basis. He also emphasized the decreasing average amount of disability income in force at the younger attained ages. From a strictly theoretical viewpoint, reserves should depend on the calendar year of disablement in addition to the other variables normally involved, but such an assumption would be impractical.

He suggested that the method employed by the Equitable of New York to solve a similar disability valuation problem might be of interest. In 1946 the company sought a valuation basis which would more closely reproduce their own experience than did modifications of the Class 3 experience which they were then using. Separate studies of their own claim and termination rates were available for the periods 1930–35, 1935–39 and

1939–43. They decided that the inclusion of the 1930–35 experience would give claim rates which would probably never again be experienced, and ultimately concluded that the experience of the period just prior to World War II would be most likely to represent what might be expected in the future. 1940 was finally agreed upon as a base year, and the arithmetic mean of the claim rates for the 1935–39 and 1939–43 periods was chosen to represent the experience of that year. The same philosophy was adopted with respect to termination rates, and the mean of the 1935–39 and 1939–43 experiences was used to obtain values for disabled life annuities. Subsequent tests involving four types of coverage similar to Benefits 1, 2, 3 and 4 in the report showed the assumptions to be sufficiently accurate, and the reserves thereunder to be adequate. The experience of the Equitable would suggest that the arithmetic average of the rates for Periods 1, 2 and 4 could be used as a valuation standard containing adequate but not excessive margins for any future adverse conditions. Since claim annuity values do not vary too widely by period, it would also seem that values based on the over-all 1930–50 termination rates could be used with these average rates of disablement.

With respect to section B, he felt that the rates for either of Benefits 2 or 4 could be adjusted to provide disability rates for use with the six months waiting period. He stated that a study of his company's experience under its policies with a six months clause providing a benefit of $5.00 per month showed results reasonably close to the corresponding adjusted crude rates for Period 4. There did not appear to be any particular evidence that the $5.00 per month benefit resulted in any less selection against the company than did the $10.00 benefit.

He held that the greater emphasis given the experience at longer durations by the use of the unweighted arithmetic mean of the experiences of several periods is satisfactory from a valuation viewpoint. The concern of the industry should be to hold reserves sufficient to provide adequate claim annuity values during the next fifteen years or so, after which the amount in force on most full disability coverages will be of relatively minor importance in the majority of companies.

MR. J. A. CHRISTMAN prefaced his discussion of section A by giving the results of some comparisons made by the Metropolitan between active life reserves on the present bases and upon the basis of the new tables. It was pointed out that the experience used was on policies all of durations over twenty years, and containing a large proportion of paid-up Limited Payment Life business. Period 2 rates, as compared with those of the 165% Modification of Class 3, gave increases in aggregate active life reserves of about 40% for Benefit 1 and 70% for Benefit 3. For Benefit 5,

a network of Whole Life factors was compared with the corresponding factors according to the 150% Modification of Class 3, and the new factors ranged from 50% to 100% of the Modified Class 3 factors, the ratio increasing both by duration and by age at entry. The use of Period 1 rates of disablement gave aggregate reserves 25% to 30% higher than the corresponding Period 2 reserves, and Period 4 rates gave aggregate reserves 25% to 30% lower than Period 2.

Although, for the reasons given in the report, it would be unwise to add the experiences of different periods to get rates of disablement for a valuation table, this, he said, does not mean we are restricted to choosing one of the three periods covered. It might, for example, be thought desirable to use a table approximately midway between the experiences of Period 2 and Period 4. Such a table could readily be made from the data in Table 3 of the report. He felt that the lack of data for Period 3 was of minor importance in making the choice of a level of disability rates for reserve purposes, and he doubted that the availability of a fourth set of data would greatly increase our ability to judge what is a safe provision for the future. With regard to termination experience, he felt that our lack of knowledge of the rates of disablement in Period 3 was not sufficient reason for discarding the substantial amount of termination data which is included in the report for Period 3. He thought that rather than consider the elimination of any particular period as such, we should consider whether or not the combined termination experience gives a reasonably safe basis for the future, taking into account the variation which has been observed between periods and the weight of each period's data in the total. On this basis the combined experience for the income benefits would seem to be satisfactory, but for Benefit 5, where the experience is almost entirely from Periods 3 and 4, there might be some reason to assume termination rates for the first fifteen years somewhat lower than those of the graduated table given in the report.

He stated that for one company the present disabled life reserves on claims arising from income benefits issued prior to 1932 (mostly at long durations) would be about 4% higher on the new table than on Class 3 factors.

MR. W. H. KELTON stated that the Travelers was in the process of studying the levels of reserves required for their various disability clauses under both the new Joint Experience and their own recent experience. They have chosen Period 2 rates of disablement and the 1930–50 termination reports as published, and view these as giving a conservative or maximum basis. Their own recent experience, which is somewhat more favorable than the Joint recent experience, they regard as a minimum basis.

The reserves actually needed will probably lie somewhere between these two assumptions.

He mentioned a point of interest in the extension to age 64 of Benefit 3 rates of disablement and rates of termination. They thought it advisable to assume lower rates of disablement at ages just prior to age 60 under a clause giving coverage to age 65 than under a clause giving coverage to age 60. A study of their own experience gave lower rates only at ages 58 and 59, the rates at these ages for coverage to age 65 being 90% and 80% respectively of the rates for coverage to age 60. They felt the abrupt change at age 58 to be accidental, and used rates of disablement for the age 65 clause graded from 99% of the Benefit 3 rate at age 54 to 88% at age 59. From these they derived extended Benefit 3 rates of disablement of 30.77 per 1,000 at age 59 (compared with 34.97 for the unextended Benefit 3 rate) and 43.33 per 1,000 at age 64. Extended termination rates for age group 60–64 under Benefit 3 were also estimated, using some rather limited experience of the company. Operating separately on the probabilities of death and recovery, they derived the termination rates per 1,000 for this age group ranging from 330 in the first year of disability to 150 in the second year, 93 in the tenth year, and the published ultimate termination rates for Benefit 3 for durations 16 and over.

MR. J. T. PHILLIPS pointed out the desirability of having new monetary disability tables based on the data in the report. Considering the economic factors involved and also the possibility that there may have been some long-range secular decrease in the level of disability rates corresponding to the secular trend in mortality rates, he felt that Period 2 rates of disablement gave a reasonably conservative basis for valuation purposes. He stated that the inclusion of the third period data in the study of termination rates is justified by the desirability of having such rates based on as large a volume of claims as can be obtained without seriously distorting the basic level of rates.

MISS J. C. McKIBBON, speaking on section B, gave the results of a study made by the London Life of its experience under the six months disability clause. The company changed to a nonretroactive six months clause in 1932, and continued to promote the writing of income disability. For several years policies with income disability have averaged around 15% of the total Ordinary issue.

The active life experience used in the study was from the calendar years 1944 to 1951, and may reasonably be compared with the Period 4 data in the report. Table 1 compares the actual claims, by amounts of insurance, with expected claims on the basis of Benefit 5 rates of disablement.

Miss McKibbon developed a theoretical rate of claim under a nonretro-

active waiver benefit only 75% of the claim rate under income disability; applying this adjustment to the waiver claim ratio of 57.4% in the table would produce an actual rate of disability 76.5% of the expected, compared with 80.6% for income and with 74% shown for Period 4 in the Committee report. She developed this adjustment factor from a disability continuation table based on crude termination rates (by number) for the London Life 1944–51 experience on disabled lives arising from income benefits under the six months clause, which showed out of 100,000 claims completing the six months waiting period, 96,230 at end of 7 months after

TABLE 1

ACTIVE LIFE DISABILITY EXPERIENCE 1944–1951 INCLUSIVE

6 Months Clause Nonretroactive

BY AMOUNT OF INSURANCE

AGES	INCOME			WAIVER ONLY		
	Exposure	Actual* Claims	Ratio Act./ Exp.	Exposure	Actual* Claims	Ratio Act./ Exp.
Under 20...	$ 4,397,400	....	......	$ 12,850,463	$ 10,297	120.4%
20–24......	48,700,862	$ 48,685	112.0%	157,406,807	75,000	53.4
25–29......	114,770,001	109,000	90.1	327,069,080	247,602	72.0
30–34......	177,681,293	185,000	88.0	394,025,614	231,587	49.8
35–39......	196,078,266	150,000	54.4	358,873,012	233,865	46.4
40–44......	150,059,331	206,054	75.2	243,809,783	225,707	50.8
45–49.....	76,936,270	204,967	105.6	132,073,493	235,357	70.1
50–54......	27,709,725	97,507	80.5	55,571,179	167,179	68.2
Total..	$796,333,148	$1,001,213	80.6%	$1,681,679,431	$1,426,594	57.4%

* Actual Claims taken on basis of (a) Age at Claim = Age at Policy Anniversary preceding disablement; (b) Experience Year = Year of Disablement.

NOTE.—The exposure includes all policy years from issue. Substandard business is included in the exposure at the rated amount and in the actual claims for the face amount.

disablement, 89,446 at end of 8 months, 82,666 at end of 9 months, 76,135 at end of 10 months, 72,869 at end of 11 months, and 65,830 at end of 12 months. Because disablement occurs on the average halfway between premium due dates, the "effective waiting periods" between the date of disablement and the due date of the first premium waived (6 months clause) is $6\frac{1}{2}$, $7\frac{1}{2}$, 9 and 12 months, respectively, for monthly, quarterly, semiannual and annual premiums. Assuming the business in force is 15% on the monthly premium basis, 10% on quarterly, 10% on semiannual, and 65% on annual and using the arithmetic mean at the beginning and end of the month for the number of continuing claims at midmonth, she found that

of the 100,000 completing the six months waiting period 75,057, or 75%, would become actual waiver claims.

Under a retroactive waiver benefit, all of the monthly, quarterly, and semiannual cases in the 100,000 would be actual waiver claims, and on the average half of the annual cases would have a premium due within the six months waiting period. The remaining half of the annual cases would on the average fall into six equal groups having premiums due $6\frac{1}{2}$, $7\frac{1}{2}$, $8\frac{1}{2}$, $9\frac{1}{2}$, $10\frac{1}{2}$ and $11\frac{1}{2}$ months respectively after date of disablement. Using the same assumptions as for the nonretroactive benefit, she found that theoretically 95% of those completing the six months waiting period would become actual waiver claims.

From this Miss McKibbon concluded that the apparently more favorable experience under the waiver disability can be taken into account only if the company uses the same kind of clause that the London Life has had in effect. For a retroactive clause, it is necessary to use the income disability experience as a basis.

The study of claim termination experience for the period 1933 to 1952 inclusive covered disabled lives under the six months waiver clause, the six months income clause, and the three months income clause issued before 1932. Recovery rates under the six months income clause are higher than under the six months waiver clause during the first year of disability, but thereafter the rates are quite similar. Under the three months clause, recovery rates are very much higher during the second six months of disability than under the six months clause, but considerably less during the third and subsequent years of disability. The comparison of actual and expected terminations by number and amount is shown in Tables 2 and 3 by age at policy anniversary preceding disablement and in Table 4 by duration from date of disablement.

Miss McKibbon questioned whether it would ever be possible to develop a basis for the valuation of a six months income or waiver disability clause from experience under a three months clause. She felt it would be more useful to endeavor to obtain valuation factors for the six months income disability clause from the six months waiver experience, with suitable adjustment for the fact that under an income clause there is an actual claim paid on every policyholder disabled for six months.

TABLE 2

COMPARISON OF ACTUAL AND EXPECTED TERMINATIONS
DISABLED LIVES 1933–1952
BY NUMBER

AGE LAST ANNIV. AT DISABLE- MENT	WAIVER—6 MONTHS CLAUSE		INCOME—6 MONTHS CLAUSE		INCOME—3 MONTHS CLAUSE	
	Actual	Ratio Act./Exp.	Actual	Ratio Act./Exp.	Actual	Ratio Act./Exp.
DEATHS AND RECOVERIES						
Under 25..	84	129.4%	32	170.6%	31	129.8%
25–29.....	137	103.7	55	129.4	57	130.8
30–34.....	93	96.4	76	126.7	108	153.5
35–39.....	114	122.3	56	111.9	86	108.8
40–44.....	62	88.3	36	124.1	124	127.5
45–49.....	58	110.3	33	141.8	140	126.0
50–54.....	25	77.0	18	156.1	150	146.7
55–59.....	1	454.5	....	....	140	138.0
All Ages	574	105.9%	306	130.2%	836	132.9%
DEATHS ONLY						
Under 25..	8	129.9%	....	....	2	74.9%
25–29.....	13	82.4	5	95.6%	7	123.9
30–34.....	13	93.8	3	34.7	11	98.8
35–39.....	17	102.3	12	126.6	8	51.6
40–44.....	12	77.6	6	92.2	24	98.9
45–49.....	15	99.4	7	108.2	40	117.2
50–54.....	9	68.5	6	135.7	55	124.9
55–59.....	1	833.3	....	....	62	98.5
All Ages	88	91.4%	39	91.6%	209	104.3%
RECOVERIES ONLY						
Under 25..	76	129.3%	32	189.0%	29	136.7%
25–29.....	124	106.6	50	134.2	50	131.8
30–34.....	80	96.8	73	142.2	97	163.8
35–39.....	97	126.6	44	108.5	78	122.8
40–44.....	50	91.3	30	133.4	100	137.0
45–49.....	43	114.7	26	154.8	100	129.9
50–54.....	16	82.8	12	168.8	95	163.1
55–59.....	....	....	....	....	78	202.7
All Ages	486	109.0%	267	138.7%	627	146.3%

NOTE.—Actual and expected terminations for duration before the 7th month or beyond the 15th year are excluded. Expected terminations are calculated on the basis of rates for Benefit 5 in the Committee report.

TABLE 3

COMPARISON OF ACTUAL AND EXPECTED TERMINATIONS
DISABLED LIVES 1933–1952
BY AMOUNT

AGE LAST ANNIV. AT DISABLEMENT	WAIVER—6 MONTHS CLAUSE		INCOME—6 MONTHS CLAUSE		INCOME—3 MONTHS CLAUSE	
	Actual	Ratio Act./ Exp.	Actual	Ratio Act./ Exp.	Actual	Ratio Act./ Exp.
DEATHS AND RECOVERIES						
Under 25	$ 185,631	144.0%	$ 99,940	201.1%	$ 61,000	137.6%
25–29	363,446	117.7	209,324	118.2	137,000	139.0
30–34	267,271	99.4	302,782	134.8	336,973	171.9
35–39	284,058	111.2	261,832	131.3	304,536	133.2
40–44	202,321	84.8	157,054	158.6	498,536	123.6
45–49	189,614	113.7	181,287	146.9	611,053	134.8
50–54	74,307	56.1	66,193	151.3	719,733	162.8
55–59	5,000	450.0	. . . .	. . . . . .	605,636	107.7
All Ages	$1,571,648	104.7%	$1,278,412	139.4%	$3,274,467	134.8%
DEATHS ONLY						
Under 25	$ 13,670	110.4%	. . . .	. . . . . .	$ 2,000	39.2%
25–29	19,645	53.7	$ 13,000	59.1%	14,000	107.3
30–34	28,996	74.7	13,500	41.5	42,000	133.9
35–39	36,542	78.9	52,500	137.8	28,505	62.6
40–44	23,400	42.7	21,500	100.1	139,176	135.3
45–49	39,350	85.2	37,500	110.4	192,640	138.3
50–54	26,510	49.7	16,245	98.2	295,392	157.9
55–59	5,000	806.5	. . . .	. . . . . .	276,551	79.1
All Ages	$ 193,113	66.8%	$ 154,245	91.0%	$ 990,264	113.3%
RECOVERIES ONLY						
Under 25	$ 171,961	147.6%	$ 99,940	223.0%	$ 59,000	150.5%
25–29	343,801	126.3	196,324	126.6	123,000	143.9
30–34	238,275	103.5	289,282	150.6	294,973	179.2
35–39	247,516	118.3	209,332	129.8	276,031	150.7
40–44	178,921	97.3	135,554	174.8	359,360	119.5
45–49	150,264	124.6	143,787	160.8	418,413	133.2
50–54	47,797	60.5	49,948	183.6	424,341	166.5
55–59	. . . .	. . . . .	. . . .	. . . . . .	329,085	154.7
All Ages	$1,378,535	113.7%	$1,124,167	150.4%	$2,284,203	146.9%

NOTE.—Actual and expected terminations for durations before the 7th month or beyond the 15th year are excluded. Expected terminations are calculated on the basis of rates for Benefit 5 in the Committee report.

TABLE 4

COMPARISON OF ACTUAL AND EXPECTED TERMINATIONS
DISABLED LIVES 1933–1952

DURATION	WAIVER—6 MONTHS CLAUSE		INCOME—6 MONTHS CLAUSE		INCOME—3 MONTHS CLAUSE	
	Actual	Ratio Act./ Exp.	Actual	Ratio Act./ Exp.	Actual	Ratio Act./ Exp.
DEATHS AND RECOVERIES—By Number						
6 Mos.–1 Yr........	172	89.2%	136	141.3%	417	195.2%
2d Year...........	220	110.1	105	132.3	204	114.3
3d Year...........	96	121.8	32	107.5	83	99.0
4th and Later Yrs...	86	121.7	33	111.1	132	86.3
All Durations..	574	105.9%	306	130.2%	836	132.9%
DEATHS ONLY—By Number						
6 Mos.–1 Yr........	24	66.1%	18	97.5%	60	95.9%
2d Year...........	35	124.7	11	96.7	48	114.4
3d Year...........	10	76.7	2	39.5	32	132.7
4th and Later Yrs...	19	101.0	8	104.0	69	96.2
All Durations..	88	91.4%	39	91.6%	209	104.3%
RECOVERIES ONLY—By Number						
6 Mos.–1 Yr...	148	94.6%	118	151.7%	357	236.3%
2d Year...........	185	107.7	94	138.3	156	114.3
3d Year...........	86	130.7	30	121.4	51	85.4
4th and Later Yrs...	67	129.2	25	113.6	63	77.5
All Durations..	486	109.0%	267	138.7%	627	146.3%
DEATHS AND RECOVERIES—By Amount						
6 Mos.–1 Yr...	$ 538,122	95.4%	$ 629,611	154.7%	$1,740,589	205.5%
2d Year...........	527,016	98.3	420,418	143.7	762,555	116.4
3d Year...........	269,109	128.1	99,374	94.0	302,340	97.7
4th and Later Yrs...	237,401	124.6	129,009	115.4	468,983	76.0
All Durations..	$1,571,648	104.7%	$1,278,412	139.4%	$3,274,467	134.8%

NOTE.—The actual and expected terminations are not shown for durations under the 7th month or beyond the 15th year. The expected is calculated on the basis of rates for Benefit 5 in the Committee report.

TABLE 4—*Continued*

COMPARISON OF ACTUAL AND EXPECTED TERMINATIONS
DISABLED LIVES 1933–1952

DURATION	WAIVER—6 MONTHS CLAUSE		INCOME—6 MONTHS CLAUSE		INCOME—3 MONTHS CLAUSE	
	Actual	Ratio Act./ Exp.	Actual	Ratio Act./ Exp.	Actual	Ratio Act./ Exp.
	DEATHS ONLY—By Amount					
6 Mos.–1 Yr.	$ 62,808	56.4%	$ 79,745	99.4%	$ 324,810	120.0%
2d Year	75,750	92.0	48,500	112.0	223,137	126.3
3d Year	13,000	34.4	3,500	19.2	162,665	155.5
4th and Later Yrs.	41,555	72.4	22,500	81.3	279,652	86.9
All Durations	$ 193,113	66.8%	$ 154,245	91.0%	$ 990,264	113.3%
	RECOVERIES ONLY—By Amount					
6 Mos.–1 Yr.	$ 475,314	105.0%	$ 549,866	168.3%	$1,415,779	245.7%
2d Year	451,266	99.4	371,918	149.2	539,418	112.7
3d Year	256,109	148.6	95,874	109.7	139,675	68.2
4th and Later Yrs.	195,846	147.2	106,509	126.7	189,331	64.2
All Durations	$1,378,535	113.7%	$1,124,167	150.4%	$2,284,203	146.9%

MR. B. T. HOLMES gave some information from the Confederation
Life experience as a supplement to Miss McKibbon's discussion. The com-
panies have issued similar benefits, but the rates of disablement under the
six months clauses of the Confederation Life were higher than those of the
London Life. Mr. Holmes presented the Confederation Life experience
(Table 1) under waiver only and waiver and income benefits using in all
cases the expected according to Period 2 Benefit 5 graduated rates (*TSA*
1952 Reports, 94). He pointed out that the percentages shown in the
table are for a postwar (approximately Period 4) experience compared
with the Period 2 expected. The Committee found the postwar experience
(excluding the first two policy years) for Benefit 5 to be 74% of the Period
2 experience as compared with 70.2% by amount and 79.5% by policy in
the Confederation Life six months waiver experience. For reasons given
by Miss McKibbon, this means that the Confederation Life postwar ex-
perience is really higher than the Committee's.

Their rate of disablement on the six months waiver and income clause has been substantially higher than for the Benefit 5 waiver only type, being 163.8% of the rate of disablement for waiver only by amount and 137.9% by number of policies. The corresponding figure from the London Life experience by amount was 140.4%. He pointed out, however, that it is to be expected that a number of claims would not be made on a waiver only benefit because of the date of premium payment in relation to the date of disability.

Mr. Holmes also submitted the Confederation Life termination rates under their waiver and their two waiver and income clauses for termina-

TABLE 1

CONFEDERATION LIFE RATES OF DISABLEMENT

(1945–52 Anniversaries)

(Aggregate basis including first 2 policy years)

	By Amounts			By Policies		
	Amount (in 1,000's)	Amount Adjusted for Ratings*	Ratio Act./Exp.	No. of Policies	No. Adjusted for Ratings*	Ratio Act./Exp.
1. Benefit 2 type†..	$521	$494	96.1%	190	178	88.8%
2. 6 months Waiver only............	564	507	70.2	254	221	79.5
3. 6 months Waiver and Monthly Income...........	419	379	115.0	86	76	109.6

* As exposures on rated cases could not be separated, actual claims were reduced in proportion to their ratings.

† Claims under this 3 months clause were limited to those in force for at least *6 months* of disability.

tions from the 1932 to the 1952 disability anniversaries (Table 2). Compared with the expected terminations for Benefit 5 in the Committee Report, no noticeable trend by age or duration was discernible, but a significant difference between the first year of disability and all later years was noticeable and they were, therefore, submitted separately.

He pointed out that these studies do not throw light on one quite important question, *i.e.*, whether, in times like the 1930's, rates of disability would rise more rapidly under the income than under the waiver only clauses. He felt it possible, however, that a multiple of the Benefit 5 disablement experience might be a reasonable temporary basis for valuation of six months income clauses until a larger actual experience develops.

TABLE 2

COMPARISON OF ACTUAL AND EXPECTED TERMINATIONS
DISABLED LIVES 1933–52—ALL AGES

YEAR OF DISABILITY	WAIVER—6 MONTHS CLAUSE		INCOME—6 MONTHS CLAUSE		INCOME—3 MONTHS CLAUSE*	
	Actual (in 1,000's)	Ratio Act./Exp.	Actual (in 1,000's)	Ratio Act./Exp.	Actual (in 1,000's)	Ratio Act./Exp.
DEATHS AND RECOVERIES—By Amounts						
1...........	$104	60.0%	$234	137.5%	$1,108	169.8%
Over 1......	409	118.4	304	100.0	1,340	116.8
Total...	$513	98.9%	$538	113.4%	$2,448	136.0%
DEATHS ONLY—By Amounts						
1...........	$ 17	53.8%	$ 57	158.7%	$ 176	95.3%
Over 1......	30	56.8	27	43.8	491	125.9
Total...	$ 47	55.7%	$ 84	85.3%	$ 667	116.1%
RECOVERIES ONLY—By Amounts						
1...........	$ 87	61.4%	$177	131.8%	$ 932	199.2%
Over 1......	379	129.3	277	114.7	849	112.1
Total...	$466	107.1%	$454	120.8%	$1,781	145.3%
DEATHS AND RECOVERIES—By Policies						
1...........	47	58.0%	49	146.3%	394	159.3%
Over 1......	200	112.4	56	100.1	542	120.6
Total...	247	95.3%	105	117.4%	936	134.3%
DEATHS ONLY—By Policies						
1...........	7	49.4%	10	147.2%	68	102.8%
Over 1......	16	63.3	9	81.1	178	131.3
Total...	23	58.3%	19	106.2%	246	121.9%
RECOVERIES ONLY—By Policies						
1...........	40	59.8%	39	146.1%	326	180.0%
Over 1......	184	120.5	47	104.8	364	115.9
Total...	224	102.0%	86	120.2%	690	139.4%

* Claims and terminations were limited to those where disability lasted at least 6 months after disablement.

MR. G. H. AMERMAN said that as a basis for premiums and reserves for a modern benefit, Period 2 and Benefit 2 was probably the best. He gave the following tables illustrating rates applicable to a benefit containing a six months waiting period.

TABLE 1

AGE	DISABILITY RATES PER 1,000*			CLAIM ANNUITIES †	
	165% Class 3	Benefit 2 Period 2	Benefit 4 Period 2	Class 3	Benefit 2
22......	5.13	1.82	2.09	2.85	3.86
27......	4.92	2.18	2.09	3.48	4.24
32......	4.93	2.59	2.55	3.93	4.66
37......	5.28	3.35	3.34	4.36	4.98
42......	6.14	4.87	4.76	4.70	5.31
47......	8.02	7.38	7.27	4.84	5.59
52......	11.76	11.10	11.41	4.70	5.89
57......	17.95	18.50	20.02	4.46	6.21

* r_z for Class 3; r'_z for Benefits 2 and 4.

† Value of 1 per year payable monthly at beginning of each month, 3% interest; Class 3 annuities are for an age $\frac{1}{4}$ year less than Benefit 2 annuities.

TABLE 2

COMPARISON OF NET ANNUAL EXTRA PREMIUMS PAYABLE TO AGE 55 FOR WAIVER OF PREMIUMS (DISABILITY BEFORE 60) AND $10 MONTHLY INCOME TO 65 WITH MATURITY AT 65 (DISABILITY BEFORE 55) CSO MORTALITY—$2\frac{1}{2}\%$ INTEREST

ISSUE AGE	ORDINARY LIFE		20 PAYMENT LIFE		20 YEAR ENDOWMENT	
	165% Class 3	Benefit 2 Period 2	165% Class 3	Benefit 2 Period 2	165% Class 3	Benefit 2 Period 2
25..........	$ 3.86	$ 3.37	$ 4.52	$ 3.69	$ 2.24	$ 1.43
35..........	5.15	5.19	4.65	4.43	3.49	3.15
45..........	7.93	9.31	7.94	8.96	8.29	9.30
50..........	11.48	14.55	11.77	14.54	12.35	15.22

Table 2 indicates that gross extra disability premiums based on the 165% Modification of Class 3 are ample at the younger ages but probably seriously deficient at the older ages. The increased slope of the progression of rates by age on the Benefit 2 basis indicates considerably higher active life reserves than on the 165% Class 3 basis. He warned companies not to be in too great a hurry to adjust rates for waiver only benefits to the new Benefit 5 basis. The experience for this benefit was largely on individuals

with relatively little income disability insurance on their lives, but future waiver only business will be on lives with some (or perhaps the limit of) income disability coverage, and the claim rate for such risks will be as large as on the income disability.

On section C he noted that the usual formula for a net annual extra disability premium is a weighted average of the one year term premiums, the weights being the values of D_x or D_x^{aa}. Where the term premium does not change radically with advancing age, the weights become unimportant. Limiting the benefit coverage to age 65 tends to level out the term premiums (as compared to full life coverage), and thus the use of D_x instead of D_x^{aa} will have even less effect on the premiums for a modern benefit than for the old life benefit.

He quoted the results of tests made of the effect of a constant lapse rate of $1\frac{1}{2}\%$ each year. This modest provision for lapse reduced the net annual extra premium by an amount ranging from 10% at age 25 to 1% at age 50.

MR. J. H. BRADDOCK pointed out that the necessity for determining active life reserve liabilities is perhaps the most important factor affecting the propriety of applying rates of disability to mixed lives in the construction of monetary functions. Since it is quite impracticable to make a true active lives valuation, there is no alternative to the use of mixed lives in determining reserve factors. He found that if the correction is made, the effect on net premiums based on the new disability study is negligible.

The question of neglecting active life mortality in constructing monetary tables for disability benefits arises naturally, since the disability factor is neglected by the use of mixed lives instead of active lives. However, he found that the effect of neglecting such mortality is to produce premiums appreciably higher than those produced by using mixed lives, and this, together with the convenience of using commutation columns based on the mortality decrement, makes it desirable to use mixed life tables.

He found that bringing lapses directly into premium calculations produces higher net disability premiums, especially at older ages. Although it does not seem appropriate to use a lapse decrement in the calculation of disability premiums, this increase in premiums suggests that lapses should not be neglected in the calculation of asset shares designed to test the adequacy of the premiums.

He concluded that despite the new disability study there is no necessity to alter the methods of approximating monetary functions for disability which have customarily been used in the past.

MR. LOUIS LEVINSON, in discussing section D, stated that the new method avoids rather than creates problems. It permits a simple, uniform

method of adjusting data for use with different waiting periods, something lacking in the past. Combined tables may be constructed in a simpler manner than before, by using the approximation $l_{x+1/2}^{ii} = L_x^{ii}$ in conjunction with continuance tables developed without regard to the waiting period. Premium formulas on the new basis can also be made simpler, as well as more accurate. However, the emphasis now placed on the date of disablement suggests that for valuation as well as for other purposes, that date be determined more carefully than has been done in the past.

The use of the date of disablement instead of the date of disability implies a theoretical difference in the basis underlying the estimate of incurred but unreported claims. On the old basis, this estimate represented claims where the date of disablement preceded the year end by at least the duration of the waiting period. On the new basis, the estimate will represent claims under which the date of disablement occurred any time before December 31.

MR. W. H. KELTON said that the rapid decline in rates of claim termination during the early months of disability made it advisable, and even necessary, to measure termination rates from inception of disability rather than from some other date. Measuring from the date of disablement reduces data to a common denominator and permits comparison of results under the different clauses and the adaptation of the data to other uses. It also simplifies the combining of the data of several companies and the interpreting of joint termination rates.

MR. J. A. CHRISTMAN pointed out that one disadvantage in the use of the date of disablement to measure claim duration is that claims now in force have generally been classified for valuation by using the date of disability. Actual regrouping of the cases according to the new basis is the ideal solution if it can be done on some mechanical basis, but sufficiently accurate valuation results would be obtained without such regrouping by interpolating the factors based on the new data for fractional durations. This gives the same result (using the four months clause as an example) as if every third case picked at random were assigned a duration one year earlier. Theoretically such an interpolation should recognize the difference in age, but he believed that this element is considerably less important than is duration.

Under the new method of determining claim dates, the single premium for $1.00 per year of income payable monthly is the summation of elements of the following form (using as an example a benefit with no payments for the first four months):

$$v^t {}_t p_x r_{x+t} v^{1/2}{}_{4/12} | \ddot{a}^{(12)}_{[x+t+1/2]} .$$

This expression recognizes that the insured becomes disabled, on the average, in the middle of the policy year, so that the insurance age at disablement is a half-age (note that the report tabulates select termination rates by age at policy anniversary preceding disablement, rather than by age at disablement). The formula provides for only eight monthly payments in the first disability year.

Mr. Christman drew attention to the fact that when calculating mean reserves for disabled lives at the end of the first calendar year of disablement, it must be kept in mind that the group of disabled lives actually admitted to benefit will contain no cases at durations shorter than the waiting period.

He also pointed out that while the report shows monthly termination rates for the first two disability years, it was found that the use of monthly rates during the second disability year adds very little to the accuracy of the annuity values.