AGE, OCCUPATION AND RESIDENCE AS VARIANTS OF THE RATE OF SICKNESS.

BY

ALBERT H. MOWBRAY.

Unless the extensive discussion and agitation of the problem of sickness loss among the industrial population now going on proves entirely abortive, our profession will soon be called upon to solve some new and very interesting problems in connection with provision for general health insurance. The solution we ultimately reach will obviously be largely influenced by our line of approach and this in turn will depend in no small degree upon our past experience and present association. Thus those of us who have been most closely associated with the business of life insurance and from our knowledge of the basis of calculations in that branch of insurance have come to attach most importance to the age of the insured are apt to carry the same mental attitude into our attack upon these new problems. On the other hand, those of us who have had extensive experience with workmen's compensation and personal accident insurance problems are apt to approach them with the feeling that industry or occupation is the most important factor to be considered.

Perhaps this will be well if enough discussion goes on before matters crystallize too far. Here, I take it, is the most appropriate place for such discussion. We all probably feel that equity requires that in any field of insurance, costs be assessed substantially according to the value of the insurance or the protection given, that is, to the probability of loss, and our difference in point of view is due to a difference in feeling as to the importance of various elements in affecting that probability. (Some of us may concede that in certain circumstances public interest requires a departure from this principle, but it must be clear that if injustice is not to be done some of those involved the extent to which this should go should be determined by the evidence of a paramount public interest.) I have recently been giving some consideration to the subject of health insurance from this point of view, and quite naturally the question

arose, "Which is the most important factor in producing changes in the rate of sickness, age, occupation or residence?"

For commercial health insurance as practiced by those companies doing a general health and accident business this question and others are quite fully answered in the paper, "The Rate of Sickness" (*T. A. S. A.*, X, 371), by the late Hiram J. Messenger, presenting the experience of the Travelers Insurance Company under certain forms of policies analyzed in various ways, among them by age, occupation (in broad divisions) and geographical sections. It must be obvious that selection both through rejection of business offered and refusal to renew except when the company felt the risk was satisfactory played a large part in the development of this experience and that it would be most unwise to draw conclusions from it as to the rate of sickness in general. Mr. Messenger, himself, made that very clear in closing the discussion on the paper at the next meeting. For a study along these lines of the rate of sickness of the general population we must then turn elsewhere. The sources of information respecting the various points discussed are largely European, but from such check data as we have I believe they will not lead us far astray. At any rate we must use what we have. Although the question itself is in a way preliminary and the results obtained are not very conclusive, the material studied and the conclusions to which I believe it points seem of sufficient interest to warrant bringing them before the Society.

Before proceeding further it will be well to define the term "rate of sickness." This is generally taken to mean the average number of days or weeks of sickness per person under observation for one year (annual full-time worker), excluding therefrom all time lost after the first six months (or other prescribed period) from sickness lasting longer than that limit. This limitation is necessary in order to exclude cases of invalidity which it is generally considered should not be covered under the same provision for insurance as the disabilities of shorter duration.

VARIATION IN THE RATE OF SICKNESS WITH AGE.

It is a truism to which it is hardly necessary to call the attention of the members of this Society that some insurance benefit is required to bring out the full measure of occurrences of an insurable contingency. There being no general and compulsory indemnity provision in the United States in the case of sickness, it must then

be obvious that we must turn to the published experience of sickness
insurance institutions in those countries where such insurance is
compulsory and where there is not liberty of contract as to the in-
surer in order to obtain data which is free from the influence of
selection, and which fairly represents conditions which are to be
expected under a general compulsory sickness insurance law.

Probably the most useful publication of data of this kind is that
of the investigation of the experience of the Leipsig Local Sick
Fund published in 1910, and summarized in the 24th Annual Re-
port of the United States Bureau of Labor, Vol. I, beginning at
page 1255. From this summary at page 1263 the figures of Table
I are taken.

TABLE I.

NUMBER OF DAYS OF SICKNESS PER 100 MEMBERS OF THE LEIPSIG LOCAL SICK
FUND, BY SEX AND AGE GROUPS, FOR COMPULSORY AND
VOLUNTARY MEMBERS. 1887 TO 1905.

| Age Group. | Number of Days of Sickness per 100 Members of Each Class. | | | |
| | Compulsory Members. | | Voluntary Members. | |
	Males.	Females.	Males.	Females.
Under 15 years.................	595	533	1,639	1,498
15 to 19 years.................	617	754	2,837	2,375
20 to 24 years.................	657	955	4,233	2,389
25 to 29 years.................	708	1,205	2,353	2,367
30 to 34 years.................	814	1,395	2,115	2,627
35 to 39 years.................	941	1,465	2,294	2,453
40 to 44 years.................	1,088	1,453	2,498	2,323
45 to 49 years.................	1,243	1,496	2,893	2,027
50 to 54 years.................	1,456	1,490	3,142	2,334
55 to 59 years.................	1,705	1,486	3,642	2,668
60 to 64 years.................	2,069	1,632	4,149	3,155
65 to 69 years.................	2,760	2,373	4,358	3,153
70 to 74 years.................	3,456	2,531	4,517	3,595
75 years and over..............	4,043	2,512	4,560	4,575

In order that these figures may be the more readily compared
with others from various sources in which the effect of selection is
shown, the data for the male compulsory members have been roughly
graduated by the graphic method by plotting the sickness rate oppo-
site the central age of the group and drawing a free-hand curve
through these points. This curve is shown as the solid line in Chart
I accompanying this paper.

Although, as noted above, we have no sickness tables for the

United States based upon coverage of an unselected population, we have for comparison with these figures the results of several sickness surveys undertaken along census lines by the Metropolitan Life Insurance Company under the direction of Lee K. Frankel and Louis I. Dublin. They have tabulated according to age the number of cases of sickness found per 1,000 exposed. In order not to unduly lengthen this paper the figures are not reproduced here but pamphlet copies of the reports of these surveys can undoubtedly be obtained by addressing the company. In the conclusion of the survey of Rochester, N. Y., Messrs. Frankel and Dublin say:

" It is of prime interest to note that the main characteristics of our tabulations agree with those of the leading sickness insurance organizations in Europe. The statistics for the Local Sick Benefit Society of Leipsig, Germany, . . . and other available data present practically the same facts of sickness variation relatively by sex and age as do our results."

It would seem then that we are justified in considering the above rates as typical of the average variation with age of the rate of sickness in the industrial community as a whole. Taking them as such we may learn something of the effect of selection by comparing with them the sickness rates of the following experiences:

(*a*) That with the voluntary membership of the Leipsig Fund.
(*b*) That of the British Friendly Societies.
(*c*) That of a large and progressive American manufacturing company.
(*d*) That of the American insurance companies with one-year term contracts.

(*a*) The data with respect to the voluntary membership of the Leipsig Fund has already been presented in Table I. As I understand it, the Fund can not refuse to insure these voluntary members and on the same page of the Report of the Bureau of Labor on which the data are given is the following comment:

" For the male voluntary members the rate shows the effect of the presence of the less desirable insurance risks; the number of days of sickness increases rapidly up to the twenty-fourth year of age, when there is a sharp decrease. In the text of the report this is explained as follows: Practically all the male population, including the weaker and those who are physically less valuable, are sent to work in the earlier ages; in a few years, however, the weaker persons must give up the occupations in which they are engaged, but realizing their need for insurance, continue their membership as

voluntary members. In the higher ages the voluntary members are also below standard physically, but the fact that they have been engaged in industrial occupations for a number of years proves that they are physically somewhat stronger than the voluntary membership composed of the younger age classes."

Further comment upon this comparison appears to be unnecessary. As this is perhaps the least important of this series of comparisons and the rates are so much higher than those in all the others, they are not shown in the chart.

(b) The British Friendly Societies are voluntary organizations with a long and honorable record of usefulness. A number of papers dealing with their operations and experience will be found in the *Journal of the Institute of Actuaries* and more recently there has been given under the auspices of the Institute a series of lectures on Friendly Society Finance by Mr. Alfred W. Watson, Actuary of the Manchester Unity (I. O. O. F.), the largest of these societies. Mr. Watson also presented a paper dealing with this subject before the Fourth International Congress of Actuaries at New York, 1903, published in the *Proceedings* of that Congress, Vol. I, beginning at page 478. From this paper (page 482) the figures in Table II following have been taken.

TABLE II.

MANCHESTER UNITY EXPERIENCE, 1893–97. ENTIRE MEMBERSHIP.
Annual Sickness per Member.

Age.	In Weeks.	In Days (7 Days per Week).
22	.85	5.95
27	.86	6.02
32	.92	6.44
37	1.02	7.14
42	1.19	8.33
47	1.39	9.73
52	1.71	11.97
57	2.22	15.54
62	2.99	20.93
67	3.94	27.58
72	4.80	33.60
77	5.01	35.07

In connection with these figures it should be borne in mind that the Manchester Unity is a large society operating on the lodge plan much as do our own fraternal orders. The contracts are not term contracts as in the case of our personal accident companies, but the membership is continuous. The members are admitted on the basis

of acceptability to the local lodge and the order as a whole and the lodge system of administration, by reason of the personal interest of all the members, tends to a reasonably careful claim administration. The figures in Table II are those for the first twelve months of disability only. After six months of sickness the benefits are reduced one half and there is a further reduction at the end of one year. This, therefore, is a natural division point. It is my understanding that industrial accidents were covered under this experience the same as other disability. In comparing these figures with
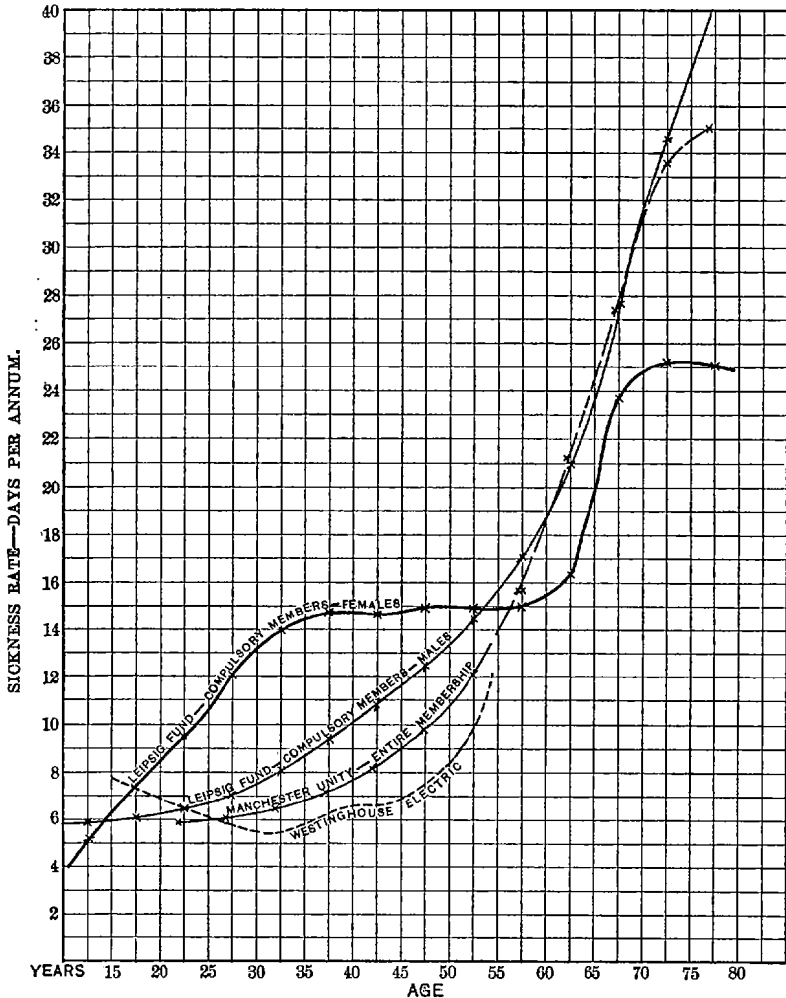

CHART I.—SICKNESS RATES ACCORDING TO AGE. VARIOUS EXPERIENCES.

those in Table I it should be remembered that the Leipsig Fund pays benefits only for thirty-four weeks, and in the case of industrial accidents only for thirteen weeks (24th Annual Report, U. S. Bureau of Labor, page 1197). To facilitate comparison these figures have been plotted on Chart I. They are represented by the broken line.

In addition to these figures Mr. Watson gives other tables which show the steady rise in the rate of sickness disclosed by successive investigations of Friendly Society experience, which it would be interesting to reproduce here as would be other data cited to show the effect of differences in type of benefit and method of operation. Such reproduction would unduly lengthen this discussion and lead somewhat away from our main question. Members interested are, therefore, referred to Mr. Watson's paper for them.

(c) For some years the Westinghouse Electric and Manufacturing Company has maintained a Relief Department and the Westinghouse Air Brake Company a Relief Fund. The experience of the former has been brought down to the close of the year 1913, and of the latter to the close of the year 1912. Disability rates derived from these data, graduated by King's method, are contained in a paper, "Sickness and Accident Disability Tables," by Mr. Miles M. Dawson, presented at the last meeting of the Actuarial Society of America and published in T. A. S. A., XVII, 274. Both sickness and accident disability are included for disability up to 39 weeks, but no disability after 39 weeks was considered in compiling the rates. At the important ages these rates are lower than the M. U. rates quoted above, being about equal to the earlier rates deduced by Mr. William Sutton from the combined experience of all the Registered British Friendly Societies from 1856 to 1880, and published in J. I. A., XXXIII, 268. The figures are not presented here in tabular form but the rates for the electric company, the larger of the two, are represented on Chart I by the dotted line. In the absence of any comment from Mr. Dawson indicating that these companies handle their relief departments in an essentially different manner from other similar American large corporations, the figures may perhaps be safely taken as typical of the experience of this type of companies. The effect of occupation, to be further discussed later, must not be overlooked in this connection.

(d) So preponderant a proportion of the data analyzed by Mr. Messenger in the paper referred to above was drawn from the pro-

fessional, clerical and commercial classes that it is hardly to be compared with that of any of the other investigations we have noticed. In one section of the business, however, the industrial classes did predominate, viz., the instalment section. Concerning this Mr. Messenger says:

" The experience in Column F., which represents insurance on industrial classes (largely railroad men) under the special health contract, and under Column G., which is practically the same thing with one year's experience added, shows a nearly uniform rate of sickness up to age fifty and then quite a decided increase except for ages above fifty-five, where the exposure is too small to be given much consideration."

The actual values of rates of sickness shown in Mr. Messenger's paper are not comparable with those quoted above, as complete coverage was not given under the policy. For this reason they are not shown in Chart I. Their importance for us in the present connection is their indication that the effect of selection and administrative methods may be to entirely prevent the normal increase of the sickness rate with age.

From a study and comparison of the above noted data we seem to be justified in drawing the following conclusions respecting the variation of the sickness rate with age:

1. In a general population the rate of sickness increases with age in a regular progression. The curve is not so steep as the mortality curve, but such that substantial reserves would be required at the older ages under any system of insurance covering the whole of life at a level premium based on the age at entrance.

2. The rate of sickness to be experienced may be much reduced by effective selection on entrance and close supervision of claims and the curve considerably flattened until the older ages are reached.

3. Under the one-year term system careful selection on renewal may make age a negligible factor until the older ages are reached, i. e., 55 and over.

VARIATION OF THE RATE OF SICKNESS WITH OCCUPATION.

In the summary of the Leipsig experience in the Report of the U. S. Commissioner of Labor, above referred to, there is (pages 1281–1341) an analysis of the experience by certain large industry groups and by age groups, showing for each industry division the days lost per thousand persons exposed for several decennial age groups, as well as for the entire industry group. As the age com-

position of the groups was of course not uniform, this latter figure did not seem the proper one to use for comparison. The following method was used to get figures which would be freer of this influence and which might, therefore, be considered a truer index of the value of occupation as a variant of the rate of sickness:

For each decennial age group the days lost were compared with the days lost per thousand exposed for the entire membership and the percentage noted. The average of these for the five decennial groups, 15–24, 25–34, 35–44, 45–54, 55–61, was then taken as the index for the occupation group. It is recognized that this method may be subjected to some criticism, but it seems sufficient for the present purpose, which is only to obtain a rough general indication of the relative sickness rate for the several industry divisions. The results of this study are given in Table III following. Although data was given for female workers in certain industrial groups, only the data respecting male members was used in this study.

TABLE III.

VARIATION OF THE RATE OF SICKNESS AMONG MALE MEMBERS OF THE LEIPSIG
LOCAL SICK FUND ACCORDING TO INDUSTRY GROUPS.

Group.		Ratio Sickness Group to Total Per Cent.
(V)	Office, etc., salesmen, etc.	61.2
(W)	Engineers and firemen, all industries	72.7
(F)	Fats, oils, paints, etc.	80.0
(E)	Hides, leather rags, etc.	82.6
(L)	Musical and chronological instruments	85.6
(B)	Hotels and restaurants	87.0
(O)	Food and drinks	90.0
(C)	Clothing and cleaning	90.2
(S)	Textiles	92.3
(H)	Gas works	93.7
(G)	Gardening, agriculture and forestry	94.9
(K)	Wood and cut materials	98.7
(T)	Transportation	99.4
(D)	Chemical industries	101.7
(M)	Leather, etc., products	102.0
(J)	Glass, porcelain, etc.	104.9
(Q)	Printing and publishing	107.1
(Y)	All others	108.4
(A)	Building trades	111.3
(P)	Paper industry	113.7
(N)	Metal working	117.2
(U)	Cement and lime	130.6
(R)	Stoneworking	155.9

In studying this table it should be kept in mind that only sickness of less than a certain duration is considered. This table is, therefore, no safe guide to relative occupation ratings where invalidity is also to be covered and this observation is true as to all material cited in this paper.

In addition to this material there is given for the Leipsig Fund (pages 1342–1347) data as to forty-one individual occupations chosen so as to represent a wide range of common occupations. This is in two sections each for males and females from age twenty-five to age thirty-four, and from age thirty-five to age fifty-four. The rate of sickness for males in the first group varies from 3,680 days of sickness per 1,000 persons exposed for the group, "shop employees, salesmen, clerks, etc.," with 4,071 exposure years, to 12,285 days of sickness per 1,000 persons for the occupation "sculptors in stone, marble, etc.," based on an observation of 2,754 exposure years. The particular occupations enumerated in the list is probably of less interest than the fact that between important and common occupations there exists at this age interval a range of variation of nearly 350 per cent. taking the lowest as the base.

I have arranged these occupations in order according to the rate of sickness, beginning with that for which it was the least, and plotted the rates of sickness in Chart II herewith. For comparison with the points so charted, I have plotted on the same chart the sickness rates for the same occupations in the age interval 35 to 54. It will be observed that the order of progression in seriousness is in general the same as for the younger age group though there are some marked reverses. This may be due in part to accidental variations introduced by the rates quoted being based upon limited observations. It is undoubtedly due in large part to a greater or less rapid deterioration of the workers in one industry as compared with another. The capacity requirements of the several occupations also have an undoubted effect. In some occupations men whose health causes much loss of time cannot be used, while in others the necessity of such absences do not require their retirement. Hence, there tends to be a transfer of weaker workers from the former type to the latter. Again it must be borne in mind that we are considering temporary sickness only, and that if invalidity were included the showing of particular occupations might be quite different.

CHART II.—SICKNESS RATES BY OCCUPATIONS. LEIPSIG FUND
EXPERIENCE—MALES.

Turning to the data of the British Friendly Societies in this re-
gard, we find that in his paper from which we have heretofore
quoted, Mr. Watson says:

"In the most recent investigation of the Manchester Unity Ex-
perience (1893–97) the data were divided, with reference to occu-
pations, into the following eight classes:

"*HJ*. The 'normal' class, including all persons engaged in occu-
pations considered to be devoid of special features so far
as concerned the risk of incapacity.
"*A*. Persons engaged in agriculture.
"*B*. Persons engaged in certain occupations entailing much ex-
posure to weather, but without particular risk, such as
building-trade operatives, urban laborers, canal boatmen,
and laborers and dock workers. It was considered prob-
able (and the results seem to establish the correctness of
the anticipation) that the lack of continuity in many of
these employments would exercise a detrimental effect on
the claim rates. It is one of the difficulties attendant on
the operations of friendly societies that when work is
slack, claims are much above the average.

"*C.* Persons engaged in the railway-transport service.
"*D.* Persons engaged in seafaring, fishing, etc.
"*E.* Persons engaged in quarry work.
"*F.* Persons engaged in iron and steel works, foundries, chemical and glass works, and other industries demanding great and continuous physical exertion with exposure to intense heat or other trying atmospheric conditions.
"*G.* Persons engaged in mining.

"A critical examination of the sickness rates of these classes led to the amalgamation of those designated *A* and *HJ*, of *B*, *C*, and *D*, and of *E* and *F*, Class *G* standing alone as presenting the maximum sickness liability discovered.

"Examples of the several rates of claim as finally deduced are shown in Table VI.

"The differences here shown scarcely call for comment; the effect of the varying incidents of occupation is apparent.

"A minor but interesting point disclosed by this inquiry was that the extra risk of occupations presented itself in the form of an increased number of claimants rather than in an increase in the average length of claim."

The table referred to by Mr. Watson as "Table VI" is here denominated as Table IV.

TABLE IV.

SICKNESS RATES IN WEEKS PER MEMBER PER ANNUM, SHOWN BY THE MANCHESTER UNITY EXPERIENCE, 1893-97, IN CLASSES ACCORDING TO THE OCCUPATION.

Ages.	Classes A, H J.		Classes B, C, D.		Classes E, F.		Class G.	
	First 12 Months of Sickness.	After 12 Months of Sickness.	First 12 Months of Sickness.	After 12 Months of Sickness.	First 12 Months of Sickness.	After 12 Months of Sickness.	First 12 Months of Sickness.	After 12 Months of Sickness.
22....	.77	.04	.90	.05	1.13	.07	1.39	.07
27....	.78	.09	.92	.08	1.13	.16	1.50	.16
32....	.83	.14	1.02	.15	1.24	.20	1.61	.22
37....	.92	.22	1.18	.27	1.41	.28	1.79	.47
42....	1.09	.35	1.35	.40	1.60	.52	2.04	.67
47....	1.27	.53	1.61	.69	1.80	.70	2.42	1.04
52....	1.60	.94	1.94	1.18	2.08	1.16	2.93	1.94
57....	2.07	1.69	2.55	2.04	2.76	2.18	3.62	2.92
62....	2.80	3.09	3.40	3.82	3.84	4.46	4.63	6.59
67....	3.82	6.33	4.16	7.88	4.88	9.42	5.24	12.22
72....	4.74	12.11	5.09	15.21	5.41	17.26	4.78	22.48
77....	5.09	19.97	4.85	23.16	4.74	26.48	3.58	26.41
82....	4.50	27.96	3.87	30.81	4.69	36.33	3.47	35.46
87....	3.67	32.45	3.60	33.78	4.50	40.42	3.64	36.00

As respects occupation, Mr. Messenger only analyzed his data into five groups, (1) Professional and Clerical. (2) Industrial

(indoors). (3) Industrial (outdoors). (4) Commercial Travelers. (5) Liquor Business. It must be evident that we are, therefore, not in a position to compare the Travelers' experience with the others as respects the variation of the rate of sickness with occupation.

From a study and comparison of the above data we are perhaps warranted in coming to the conclusions that:

1. The extent of variation in sickness rates with occupation is much greater when individual occupations are used as the basis of distinction than where the industry in which the worker is employed is the basis.

2. The extreme limits of variation with the individual occupation are much further apart than are the limits of variation with age for the more important ages, though the difference is not so great as between the sickness rates for the ages 20 to 30 and those for ages 70 and over.

3. When the basis of distinction is the large industry group, a general population experience such as the Leipsig experience will show about the same limit of variation as between the sickness rates for the limiting ages for the more active period of life, say 20 and 55.

4. In an experience such as that of the British Friendly Societies where selection of membership takes place the variation with occupation, using large groups as the basis of study, will be less wide than with age. Of course, this assumes a similar selective policy to that of the Manchester Unity, or a tendency for the society to follow certain trade lines in securing its membership.

VARIATION IN SICKNESS RATE ACCORDING TO RESIDENCE.

There seems to be less satisfactory data for the study of variation of the rate of sickness according to residence than for the study with respect to age or occupation. At least I have not been able to find much material and such as I have found only permits study on very broad lines.

For comparison with the data of the Leipsig Fund we have in the *Proceedings* of the Fourth International Congress (Vol. I, page 468) a brief note by Dr. J. P. Janse, Actuary of the " Orange Nassau " Life Insurance Company, Amsterdam, comparing the experience of certain very similar sickness institutions in Switzerland, Holland and Austria. Almost no information is given as to

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the operations of the several funds whose experience is compared, although Dr. Janse says of the Swiss and Dutch data, "Both tables of sickness have been derived from statistics of cases of sickness among persons who are in much the same conditions of life."

As will be seen from an inspection of Table V, taken from this note, and comparison of the rates with those of the Leipsig Fund, it would appear that the variation between places is relatively slight. We must however make due allowance for our lack of knowledge of the precise conditions under which these rates were developed.

TABLE V.

COMPARISON OF SICKNESS RATES IN VARIOUS EUROPEAN COUNTRIES.

Age.	Switzerland.	Holland.	Austria.
20.............	5.39	4.77	6.2
25.............	4.85	5.02	6.1
30.............	5.41	5.47	6.8
35.............	6.48	6.26	7.6
40.............	7.24	7.25	8.5
45.............	7.96	8.06	9.6
50.............	9.82	9.22	10.7
55.............	12.92	12.14	12.5
60.............	16.12	16.26	15.2
65.............	19.32	20.42	19.2
70.............	22.59	27.35	24.2

Mr. Messenger has analyzed his data, which comes from an exclusively American experience, into three sections according to geographical divisions, North, South and West. With respect to this he says:

"The geographical divisions of this experience show that there is very much less sickness in the north than in the south, with the west not as favorable as the north, except in the case of the general health policy where the showing for the west on a very small exposure (only one hundred and eighty years) is exceedingly favorable. This variation in the rate of sickness in the different sections of the country—with the north giving invariably better results than the south—is confirmed by the Travelers' experience in other lines of business. The Travelers' life experience shows the highest mortality rate in the south, the lowest in the north and an average rate for the west; and, a similar statement can be made in regard to the loss ratios of the Travelers' business in its accident and liability lines."

From personal observation while resident in one of the southern states, I am inclined to believe that a part of this showing is due

to the inability of that company, or any company, to secure in that section an agency staff which would be as effective in securing a carefully selected line as in other sections of the country. Mr. Messenger also analyzed the experience according to whether the insured lived in a town or city of 25,000 or more inhabitants or in communities of under 25,000 or the rural districts. This showed a considerably lower sickness rate for the former than the latter. We have not enough other data to indicate how much of this effect was due to a less rigid selection and how much to a real difference in the rate of sickness.

Examining the sickness surveys of Rochester, N. Y., Boston, Mass., and the state of North Carolina made by the Metropolitan Life Insurance Company, we note a finding of sickness among males 15 years of age and over as follows:

TABLE VI.

SICKNESS REVEALED BY SURVEYS OF THE METROPOLITAN LIFE INSURANCE
COMPANY.

Location.	Date.	Total Sick per 1,000 Persons Observed.	Unable to Work per 1,000 Persons Observed.
Boston, Mass........	July 17–24, 1916	24.3	21.6
Rochester, N. Y......	Sept. 13–20, 1915	27.3	23.2
No. Carolina........	April 17–24, 1916	White, 31.4	25.4
		Colored, 28.9	24.6

These results are in line with those reported by Mr. Messenger, but the variation is not so marked. They indicate that residence influences the variation in the sickness rates less markedly than either age or occupation. This conclusion cannot, however, be relied on so confidently as with respect to the other factors, due to the necessary limitations of the census method.

CONCLUSION.

In closing this discussion, I must express my regret that I am not able to present any new material bearing on the important problems before us. Further search might have revealed further material as valuable or more valuable than that here noted. I trust that some of our younger members with less pressure upon their time may be induced to make further search, as I do not feel that

the question that prompted this investigation has been sufficiently answered by this rather preliminary survey of the ground. The actual basis of rate determination that will be adopted if we are called upon to freely cover the contingency of sickness must of necessity be largely determined by the administrative machinery provided for such coverage. It seems to me that if the problems of sickness insurance are to be correctly solved, the factors above considered must be weighed very carefully in formulating legislation. To cite but one instance of difficulties encountered in meeting them when they are not provided for in the basis of rates, we may point out that in Great Britain, where the contribution from the insured, his employer and the state are fixed in amount regardless of age, occupation or residence of the insured, and where it is optional with the worker where he will be insured, a very cumbersome system of reserve or transfer value accounting between the government and the approved societies has been necessary in order that societies composed largely of young members may not receive an unduly large share of the government contribution at the expense of those composed of older members. It has further been necessary to provide for deposit insurance, a sort of savings bank arrangement, for those who cannot obtain insurance with an approved society. It is also my understanding that some of the societies whose membership is largely drawn from those occupations where the sickness rate is low have found the rates sufficient to permit benefits in excess of the minimum prescribed by law and others whose membership is drawn from less healthy occupations are finding the rates insufficient to provide such minimum benefits.

I have no desire to start a partisan debate here by raising questions with respect to which our professional judgments can not but be influenced by the interests of the companies with which we are associated. Hence I refrain from pursuing this line of discussion further. Probably enough has been said to make clear to any reader the importance of a thorough study of the problem of all variations in the rate of sickness and the causes thereof, as well as the relations of these to the problems of insurance organization and rate-making.