

MASSACHUSETTS COMPULSORY AUTOMOBILE
LIABILITY INSURANCE

BY

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At a meeting of the Casualty Actuarial Society held on May 13, 1927 I presented a paper entitled "Compulsory Automobile Insurance" (*Proceedings*, Vol. XIII, page 188), which dealt wholly with the problems encountered prior to January 1, 1927 when the Massachusetts Compulsory Motor Vehicle Security Law became effective. It is time that another paper was presented in order that our members may be kept informed of the developments.

The first set of rates for the writing of policies under the Compulsory Security Law was established by the Commissioner of Insurance on September 1, 1926. As pointed out in my previous paper no experience under a compulsory law was available and the rates had to be determined for new conditions from a study of the experience on voluntarily insured cars.

In July 1927 the first experience under the compulsory law became available. This experience was for the first five months of 1927. It was required by statute that the rates for 1928 must be available by September 1, 1927, so that it was impossible to wait for any greater spread of experience if the 1928 rates were to be based upon any data developed under the law. The rates for 1927 were established by the Commissioner of Insurance as required by the statutes but it was further provided in the statutes that rates for subsequent years should be approved by the Commissioner rather than be established by him. It was incumbent on the insurance companies, therefore, to review the five months' experience and submit rates to the Commissioner of Insurance for his approval.

The experience for the first five months of 1927 was very meager. It was readily apparent from these data that the rates for 1927 were going to be inadequate but because of the limited exposure it could not be ascertained with any degree of accuracy just how much too low the rates would prove to be nor whether the inadequacy was due to a particular locality or type of car. The insurance companies, therefore, in spite of the fact that it was known that the rates were inadequate, recommended to the Commissioner of

Insurance that the 1927 rates be continued for 1928 and this recommendation was approved by the Commissioner.

During the summer of 1928, however, conditions with respect to rates were radically different than they had been in the summer of 1927. The law had been amended so that once again the Commissioner of Insurance was required to establish rates. In place of having only five months' experience available there now was the experience of the full year of 1927 tabulated for review. The experience was based upon losses paid to March 31, 1928 with outstanding losses valued as of a date not earlier than March 31. The outstanding losses were filed with the Massachusetts Automobile Bureau during April 1928 and the tabulation was completed early in June.

Before proceeding further in this history of Massachusetts Automobile rates we must get before us the make-up of the 1927 rates. As established by the Commissioner of Insurance the 1927 rates were divided as follows:

Losses.....	59.8%
Expenses.....	37.7%
Profit.....	2.5%

With a permissible loss ratio of 59.8% underlying the rates, the test for adequacy is a comparison of this permissible loss ratio with the loss ratio actually produced.

The combined state-wide statutory experience on a manual rate basis for 1927 with losses valued not earlier than March 31, 1928 was as follows:

Earned Premiums.....	\$16,806,377
Incurred Losses.....	11,538,131
Incurred Loss Ratio.....	68.7%

Since the actual 1927 loss ratio for all classes over the entire state was 68.7% it was self-evident that as regards 1927 the rates were inadequate in the ratio of 68.7% to 59.8% or approximately 15%.

An analysis of the experience indicated, of course, that a flat upward increase of 15% in all rates, while producing an adequate rate level, would not be just nor non-discriminatory as required by law. The actual loss ratio for all private passenger cars was 73.5% while the actual loss ratio for all commercial cars was only 58.2%. It was obvious that a flat increase was not proper for both private passenger and commercial cars. The actual 1927

loss ratio for Territory 1 was 76.4% while the actual loss ratio for Territory 2 was 66.6% and for Territory 3 only 61.3%. A flat increase over the entire state was obviously incorrect.

The problem before the Bureau was to analyze the experience to determine its credibility and to recommend to the Commissioner of Insurance the best judgment of the Bureau as to any changes in classifications and rates which were necessary to meet the requirements of the law.

It was apparent from simply a casual glance at the experience that the pure premiums for the towns in each territory varied widely, even where there was a fair amount of exposure and the question immediately arose as to how far it was possible to true up the rates by selecting pure premiums for individual towns. An attempt to do this soon led into difficulty, for if one town with a certain exposure was treated individually other towns of like exposure must be treated similarly. The degree of variation from the average has little bearing, for if a certain exposure received full credibility in one case, the same exposure must receive full credibility in all cases if exposure is the only criterion recognized. The Bureau, therefore, adopted the principle that with only a single year of experience, no single city or town would be selected as having a sufficient exposure to indicate its own rate. Acting on this principle no single city or town was changed from one territory to another regardless of whether its experience varied upward or downward from the average. The proposed changes recognized the principle of charging particular towns for bad experience and giving credit to towns with good experience but did this only as respects groups of towns. On one year's experience this procedure was justified. When another year's data are available it may be possible to go still farther and base the rates for some towns on their own experience and to go part way in the direction of the town indication in many other cases.

During 1927 and 1928 the Commonwealth of Massachusetts was divided into three territories for rating purposes, as follows:

Territory 1—Boston and 17 other cities and towns closely surrounding Boston.

Territory 2—Boston Suburban, together with Fall River, New Bedford, Worcester and Springfield with their respective suburbs.

Territory 3—Remainder of the State.

In the analysis of Territory 1 it was apparent that there were two distinct groups of towns within each of which the variation in pure premiums is not so marked.

<i>Territory 1 A</i>		<i>Territory 1 B</i>	
Chelsea.....	58.93	Malden.....	25.67
Revere.....	45.00	Brookline.....	24.05
Boston.....	32.02	Milton.....	23.87
Somerville.....	30.55	Quincy.....	22.95
Cambridge.....	30.43	Arlington.....	21.54
Everett.....	28.85	Winchester.....	21.52
Winthrop.....	27.35	Medford.....	21.33
		Watertown.....	20.56
		Dedham.....	17.27
		Belmont.....	17.00
Average.....	32.67	Average.....	21.25

The exposure in the territory referred to as 1 A was 92,750 car years and in Territory 1 B the exposure was 56,230 car years. The Bureau recommended that this division of Territory 1 be made for 1929. It is justified not only by the experience but by a knowledge of the conditions surrounding Boston. All of the towns in the proposed Territory 1 A are on what is known as the North Shore Route. Practically all the traffic leaving Boston for the North Shore passes through these seven towns and along one heavily congested boulevard which, of course, is conducive to accidents. While there is some variation within each proposed territory from the average pure premium, the greatest variations are in the towns with the smaller exposures which, if recognized, require similar treatment for other towns of like exposure.

Territory 2 divides itself geographically into four main sections—Boston Suburban, Fall River and New Bedford, Worcester and Springfield with the following pure premiums.

Boston Suburban.....	18.38
Fall River and New Bedford....	15.21
Worcester.....	15.87
Springfield.....	15.50

It was obvious that a division of Territory 2 into two parts was proper. The pure premiums for Fall River and New Bedford, Worcester and Springfield are so close together that they can be grouped for rating purposes but should be separated from Boston Suburban. The Bureau recommended, therefore, that this division be made.

Territory 3, which contains all the other towns in the state, does not divide itself naturally into any groups of towns nor was there any radical variance in pure premium so the Bureau recommended the continuance of this territory without change.

Summarized, the Bureau recommended that for 1929 there be five territories for private passenger cars in place of the three territories in 1927 and 1928 and that these territories be constituted as follows:

<i>Territory 1</i>	<i>Territory 2</i>	<i>Territory 3</i>	<i>Territory 4</i>	<i>Territory 5</i>
Chelsea	Malden	Boston Sub-	Fall River &	Remainder of
Revere	Brookline	urban	Suburbs	State
Boston	Milton		New Bedford	
Somerville	Quincy		& Suburbs	
Cambridge	Arlington		Worcester &	
Everett	Winchester		Suburbs	
Winthrop	Medford		Springfield &	
	Watertown		Suburbs	
	Dedham			
	Belmont			
	Newton			

After having decided on the territorial divisions of the state for private passenger cars the next problem was the selection of pure premiums for the respective classification divisions.

In the proposed Territory 1 A the division was—

W.....	31.27
X.....	31.81
Y.....	41.54
Average.....	32.67

The pure premiums for W and X cars were so close together as to make a differential unwarranted. The combined W and X experience indicated a pure premium of 31.51. The Bureau recommended, therefore, that the pure premium indicated by the combination of W and X cars of 31.51 be used as a basis for the 1929 rates for W and X cars in Territory 1 A and that the indicated pure premium of 41.54 be used for Y cars.

A similar situation was apparent in Territory 1 B where the pure premiums were—

W.....	20.96
X.....	19.93
Y.....	26.65
Average.....	21.25

The Bureau recommended that the pure premium indicated by the combination of W and X cars of 20.49 be used as a basis for the 1929 rates for W and X cars in Territory 1 B and that the indicated pure premium of 25.65 be used for Y cars.

For Territory 2 A the Bureau recommended the adoption of the indicated pure premiums of—

W.....	16.41
X.....	19.76
Y.....	25.00
Average.....	<u>18.38</u>

For Territory 2 B the Bureau recommended the adoption of the indicated pure premiums of—

W.....	13.97
X.....	15.47
Y.....	23.41
Average.....	<u>15.53</u>

For Territory 3 the Bureau recommended the adoption of the indicated pure premiums of—

W.....	9.10
X.....	13.92
Y.....	18.65
Average.....	<u>11.35</u>

The situation with respect to commercial cars was radically different from that for private passenger cars. The combined state-wide loss ratio for all commercial cars was 58.2% as compared with the permissible loss ratio of 59.8%. This would indicate a reduction of 2.7% in the rate level for commercial cars. A flat reduction, of course, is justified only if it can be shown that the reduction is not confined to an individual territory or classification.

By territory the commercial car experience indicated loss ratios of—

Territory 1.....	58.4%
Territory 2.....	58.2%
Territory 3.....	57.6%

By classification the commercial car experience for the entire state indicated loss ratios of—

Class 2.....	51.0%
Class 3.....	60.1%
Class 4.....	58.2%

By weight of vehicle the commercial car experience for the entire state indicated loss ratios of—

Heavy.....	45.9%
Medium.....	56.1%
Light.....	61.6%

It was apparent that the territorial differentials were proving satisfactory and a flat reduction was proper over the state. By classification the only group out of line was Class 2 for which the exposure was only 69.4 car years. By weight of vehicle the only

group out of line was the Heavy group for which the exposure was only 4522. car years.

The Bureau recommended, therefore, that no changes be made in the 1927 and 1928 territories but that all commercial car pure premiums be reduced 2.7% as indicated.

The public automobile classes in the manual permit of the writing of insurance in a number of ways. Livery cars and busses may be written on either a specified car basis or on an earnings basis. Taxicabs may be written on a specified car basis or on a mileage basis. It was obvious that the exposure on each class was too small to be indicative but as a whole the public automobile experience indicated that the rates for 1927 and 1928 were too high.

The combined loss ratio for all public automobile classifications for the entire state was 49.8% which when compared with the permissible loss ratio of 59.8% indicated a reduction of 16.7% and the Bureau recommended that the pure premiums underlying the 1927 and 1928 rates be reduced 16.7% as a basis for the 1929 rates.

The next step in the development of rates was the determination of the expense loading. In the 1927 and 1928 rates the expense loading totaled 40.2%, divided as follows:

Administration.....	8.7
Claims.....	10.4
Bureau & Inspection.....	1.1
Taxes.....	2.5
Acquisition.....	15.0
Profit.....	2.5
	<u>40.2</u>

The Constitution of the Bureau provides that the expense loading shall be determined by the stock companies on the basis of their own experience. In response to a call for experience data the stock companies reported as follows:

Administration.....	8.63%
Claims.....	9.96
Inspection.....	.91
Bureau.....	.21
Field Supervision.....	2.51
Acquisition.....	16.76
Taxes.....	2.50
Miscellaneous.....	.04
	<u>41.52</u>

The administrative cost is not a direct function of the rate level as are some of the other expense items. With a higher premium

level the amount of dollars expended for administration would not change necessarily. With an increase in pure premiums as recommended, the same amount of dollars expended for administration would be only 7.50% of the new premium level.

The brokers and agents had protested the decrease in the commission allowed in the 1927 and 1928 rates and had requested the companies to recommend a higher commission level for 1929.

After considering these data together with the request of the producers the Bureau recommended the following expense loading for 1929:

Administration.....	7.50%
Claims.....	9.96
Bureau & Inspection.....	1.00
Field Supervision & Acquisition..	20.00
Taxes.....	2.50
Profit.....	2.50
	<u>43.46%</u>

The pure premiums and expense loadings recommended by the Bureau were all based directly on the 1927 experience. The rates, however, were for 1929 and there was a feeling on the part of the companies that these data were not indicative of 1929 conditions. Consideration was, therefore, given to the trend of experience as shown by the 1928 experience brought down to May 31, 1928. A comparison of the five months' experience for 1927 and 1928 showed—

	1927	1928
Earned Premiums.....	5,150,302	6,048,436
Incurred Losses.....	2,629,881	3,471,140
Loss Ratio.....	51.1%	57.4%

A comparison of these loss ratios would indicate that the first five months of 1928 were 12.3% worse than for a corresponding period of 1927.

As a check against the increase in earned premiums, the registration figures of the Registry of Motor Vehicles for 1927 and 1928 showed—

	1927	1928
January.....	377,651	421,162
February.....	27,655	27,117
March.....	67,744	54,028
April.....	116,526	114,777
May.....	56,918	68,448

Reduced to a basis of earned car years as of May 31 these figures would be—

	1927	1928
Earned Car Years.....	208,760	223,561
Incurred Losses.....	2,629,881	3,471,140
Pure Premiums.....	12.60	15.53

These pure premiums would indicate that the first five months of 1928 were 23% worse than the first five months of 1927.

The Bureau recommended, therefore, that a trend factor of 1.15 be introduced into the rates for 1929.

These recommendations were presented to the Commissioner of Insurance in August 1928. After a complete explanation of the reasoning of the Bureau committee the Commissioner was satisfied with the revised territories and the proposed pure premiums. He refused to permit of the introduction of the trend factor and made no announcement at that time of the expense loading which he would use in establishing rates.

The statutory law requires that the rates be established after a public hearing. In accordance with this provision of the law the Commissioner called a public hearing for August 17, 1928. There was no provision in the law as to how this hearing should be conducted nor as to what basis should be used for discussion. The Commissioner of Insurance, however, decided that it was his duty to inform the public as to some of the conclusions which he had reached and give some indication as to what he proposed to do. He, therefore, opened the hearing by stating that he had practically decided to change the territories from three to five and gave the pure premiums which he contemplated using. The newspaper men took the pure premiums which the Commissioner announced and using the existing expense loading broadcast the resulting rates.

The new Territory 1, of course, showed a large increase and immediately trouble arose. A national election, as well as a state election, was approaching. Politicians sought to make capital out of the increases and pressure was brought upon the Commissioner of Insurance to change his mind. Reserves were attacked and the Commissioner was accused of accepting the figures of insurance companies without check. The newspapers were full of criticism of the Commissioner and the companies. The Com-

missioner was firm, however, in his belief that he was correct in doing what he felt was proper and refused to yield to the terrific pressure brought to bear upon him by political aspirants.

The law required that rates be established by September 1 and for over two weeks the Commissioner of Insurance was a target to be vilified, threatened and cajoled in an attempt to force him to give way. He was not physically able to withstand the pressure put upon him, and on September 1 he resigned without establishing rates for 1929. As a matter of record in the Society's *Proceedings*, I quote two paragraphs from the letter of resignation to the Governor.

"The result is that no memorandum revising these rates will be filed by me, and the rates established for the year 1928 will stand. This relieves you and his honor, the Lieutenant-Governor, of any necessity of fighting me in the courts, and the Attorney-General of the necessity of defending me against his will.

"As I view the whole matter now, this unusual situation of an under-executive having to contest with his superiors in authority is the result of an attempt to solve a mathematical problem by the introduction of a factor of political expediency. This is neither right nor proper."

This resignation placed the companies in a very precarious position. The letter of resignation intimated that it was the Commissioner's understanding that existing rates would continue. The companies could not afford to continue to write this business at existing rates so counsel was retained to examine the facts and the law to determine upon a course of action. The result was that a petition was filed with the Supreme Court based on the premise that no rates for 1929 were available. In November 1928 the Supreme Court upheld this contention and after ruling that no rates were available for 1929 ordered the Acting Commissioner of Insurance to establish rates forthwith.

On November 17, 1928 the Acting Commissioner of Insurance established rates for 1929 as ordered by the Supreme Court. These rates are based upon the territories and pure premiums as recommended by the companies with but little change. A re-valuation of reserves as of September 1, 1928 indicated that the cases settled between April 1 and September 1 had been settled for five per cent. less than the reserves set up as of April 1. This five per cent. spread over all the losses amounted to two per cent.

so the Acting Commissioner of Insurance reduced all pure premiums two per cent. He also reduced the acquisition expense five per cent. which made a reduction in the rate level of ten per cent. from that proposed by the companies except for the trend factor which was not allowed by either the Commissioner or the Acting Commissioner.

The net effect of this change in rates was an increase in rate level of 6.1%. By territories the change was as follows:

Territory 1.....	27.4%	Increase
2.....	8.0%	Decrease
3.....	8.0%	Increase
4.....	8.6%	Decrease
5.....	4.9%	Decrease

Average..... 6.1% Increase

Approximately fifty bills proposing changes in the Motor Vehicle Security Law have been introduced into the present Legislature. These bills range from state fund bills to bills repealing the act. There are bills to eliminate territorial divisions and a bill for requiring operators instead of owners to provide the security. The Insurance Committee of the Legislature has proposed that none of these bills be passed but that a Special Recess Commission be appointed to investigate all phases of the Compulsory Motor Vehicle Security Law including rates and report at the next session of the Legislature in 1930. This proposed investigation has passed both houses of the Legislature and is now awaiting the Governor's signature.

While the net effect of the revision is a 6.1% increase it must be borne in mind that with the acquisition cost reduced 5% the companies have available for losses considerably more than represented by the 6.1% increase. The companies must now operate on a permissible loss ratio of 65.5% in place of 59.8% as in 1927 and 1928.

This paper is more or less historical. It was written with the feeling that a record of the Massachusetts experiment with the first Compulsory Motor Vehicle Security Law should be made available for the members of the Society. There are a number of appendices to the paper which need no explanation but which will enable members to see the whole picture in concrete form.

APPENDIX A

MASSACHUSETTS STATUTORY LIABILITY EXPERIENCE
POLICY YEAR 1927

Compiled June, 1928

CLASS	Earned Car Years	Earned Premium	Losses Incurred	No. of Claims	Claim Freq.	Average Claim Cost	Pure Premium	Loss Ratio
<i>Private Passenger</i>								
W.....	257,122.3	5,649,494	4,291,181	18,002	7.00	238	16.69	76.0
X.....	164,955.7	4,740,833	3,332,785	14,324	8.68	233	20.20	70.3
Y.....	48,850.5	1,770,399	1,318,490	4,911	10.05	268	26.99	74.5
<i>Total</i>	470,928.5	12,160,726	8,942,456	37,237	7.91	240	18.99	73.5

Commercial

<i>Class 2:</i>								
Heavy	17.5	1,907	1,879	4	22.86	470	107.37	98.5
Medium...	253.8	31,607	16,925	94	37.04	180	66.69	53.5
Light.....	423.1	43,698	20,612	82	19.38	251	48.72	47.2
<i>Total</i>	694.4	77,212	39,416	180	25.92	219	56.76	61.0
<i>Class 3:</i>								
Heavy	1,821.9	190,245	95,717	411	22.56	233	52.54	50.3
Medium...	3,722.2	261,828	163,640	691	18.56	244	45.31	64.4
Light.....	3,145.1	154,694	100,310	454	14.44	221	31.89	64.8
<i>Total</i>	8,689.2	606,767	364,667	1,556	17.91	234	41.97	60.1
<i>Class 4:</i>								
Heavy	2,682.9	204,023	84,410	403	15.02	209	31.46	41.4
Medium...	12,938.9	687,021	384,455	1,663	12.85	231	29.71	56.0
Light.....	40,032.5	1,290,800	795,954	3,697	9.23	215	19.88	61.7
<i>Total</i>	55,654.3	2,181,844	1,264,819	5,763	10.35	219	22.73	58.0

ALL TERRITORIES ALL CLASSES

Public Automobiles

<i>Specified</i>	2,995.4	330,236	134,412	598	19.96	225	44.87	40.7
<i>Earnings</i>	35,518	134,424	122,735	385	1.08	319	3.46	91.3
<i>Mileage</i>	316,545	545,534	246,157	1,260	.004	195	.01	45.1

Garages, Dealers and Manufacturers

<i>Payroll</i>	435,611	516,566	262,191	1,030	.24	255	.60	50.8
<i>Specified</i>	327.1	11,236	2,056	13	3.97	158	6.29	18.3
<i>Earnings</i>	5,033	15,224	6,002	26	.52	231	1.19	39.4

Miscellaneous Classes—Specified Car Basis

<i>Total</i>	11,540.0	226,608	153,220	471	4.08	325	13.28	67.6
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APPENDIX B
 MASSACHUSETTS STATUTORY LIABILITY EXPERIENCE
 POLICY YEAR 1927

Compiled June, 1928

CLASS	Earned Car Years	Earned Premium	Losses Incurred	No. of Claims	Claim Freq.	Average Claim Cost	Pure Premium	Loss Ratio
<i>Private Passenger</i>								
W.....	71,446.8	2,071,958	1,966,379	8,581	12.01	229	27.52	94.9
X.....	68,565.3	2,166,916	1,601,676	7,488	12.79	214	27.35	73.9
Y.....	18,967.3	853,532	656,311	2,684	14.15	245	34.60	76.9
Total	148,979.4	5,092,406	4,224,366	18,753	12.59	225	28.36	83.0

Commercial

<i>Class 2:</i>								
Heavy ...	2.7	572	88	1	37.04	88	32.59	15.4
Medium ..	97.5	18,914	13,300	79	81.03	168	136.41	70.3
Light	177.3	28,014	12,077	52	29.33	232	68.12	43.1
Total	277.5	47,500	25,465	132	47.57	193	91.77	53.6
<i>Class 3:</i>								
Heavy ...	839.3	126,736	51,808	252	30.03	206	61.73	40.9
Medium ..	1,384.6	156,461	100,814	406	29.32	248	72.81	64.4
Light	961.1	81,698	49,981	249	25.91	201	62.00	61.2
Total	3,185.0	364,895	202,603	907	28.48	223	63.61	55.5
<i>Class 4:</i>								
Heavy ...	1,337.9	143,154	56,626	294	21.97	193	42.32	39.6
Medium ..	4,653.0	395,509	211,276	1,012	21.75	209	45.41	53.4
Light	10,789.5	625,791	424,793	1,964	18.20	216	39.37	67.9
Total	16,780.4	1,164,454	692,695	3,270	19.49	212	41.28	59.5

TOTAL TERRITORY I

Public Automobiles

<i>Specified...</i>	790.0	112,354	42,554	249	31.52	171	53.87	37.9
<i>Earnings...</i>	12,839	53,926	66,580	196	1.53	340	5.19	123.5
<i>Mileage....</i>	285,711	499,996	205,844	1,098	.004	187	.01	41.2

Garages, Dealers and Manufacturers

<i>Payroll</i>	239,083	334,629	144,282	586	.25	246	.60	43.1
<i>Specified...</i>	176.0	6,128	1,740	8	4.55	218	9.89	28.4
<i>Earnings..</i>	1,422	4,948	2,450	15	1.05	163	1.72	49.5

Miscellaneous Classes—Specified Car Basis

<i>Total</i>	1,879.4	63,038	46,268	175	9.31	264	24.62	73.4
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APPENDIX C
MASSACHUSETTS STATUTORY LIABILITY EXPERIENCE
POLICY YEAR 1927

Compiled June, 1928

CLASS	Earned Car Years	Earned Premium	Losses Incurred	No. of Claims	Claim Freq.	Average Claim Cost	Pure Premium	Loss Ratio
<i>Private Passenger</i>								
W.....	101,121.9	2,224,680	1,554,992	6,494	6.42	239	15.38	69.9
X.....	63,729.5	1,720,702	1,137,447	4,847	7.61	235	17.85	66.1
Y.....	18,858.1	641,174	456,560	1,609	8.53	284	24.21	71.2
<i>Total</i>	183,709.5	4,586,556	3,148,999	12,950	7.05	243	17.14	68.7

Commercial

<i>Class 2:</i>								
Heavy ...	10.5	1,081	1,791	3	28.57	597	170.67	165.7
Medium ..	106.3	9,992	3,440	12	11.29	287	32.36	34.4
Light	147.5	11,359	8,535	30	20.34	285	57.86	75.1
<i>Total</i>	264.3	22,432	13,766	45	17.03	306	52.08	61.4
<i>Class 3:</i>								
Heavy ...	695.0	51,428	35,694	129	18.56	277	51.36	69.4
Medium ..	1,328.6	73,088	46,077	187	14.07	246	34.68	63.0
Light	1,142.8	47,995	31,996	143	12.51	224	28.00	66.7
<i>Total</i>	3,166.4	172,511	113,767	459	14.50	248	35.93	65.9
<i>Class 4:</i>								
Heavy ...	932.8	48,503	20,239	89	9.54	227	21.70	41.7
Medium ..	5,147.6	216,196	125,290	482	9.36	260	24.34	58.0
Light	16,426.9	459,954	262,186	1,316	8.01	199	15.96	57.0
<i>Total</i>	22,507.3	724,653	407,715	1,887	8.38	216	18.11	56.3

TOTAL TERRITORY 2

Public Automobiles

<i>Specified...</i>	966.4	105,635	49,601	183	18.94	271	51.33	47.0
<i>Earnings...</i>	10,458	43,571	45,083	128	1.22	352	4.311	103.5
<i>Mileage....</i>	27,957	41,939	37,450	151	.01	248	.013	89.3

Garages, Dealers and Manufacturers

<i>Payroll....</i>	117,267	123,053	84,275	326	.28	259	.72	68.5
<i>Specified...</i>	87.7	3,275	16	4	4.56	4	.48	.5
<i>Earnings...</i>	820	2,362	72	2	.24	36	.09	3.0

Miscellaneous Classes—Specified Car Basis

<i>Total</i>	3,941.4	83,188	63,105	183	4.64	345	16.01	75.9
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APPENDIX D

MASSACHUSETTS STATUTORY LIABILITY EXPERIENCE
POLICY YEAR 1927

Compiled June, 1928

CLASS	Earned Car Years	Earned Premium	Losses Incurred	No. of Claims	Claim Freq.	Average Claim Cost	Pure Premium	Loss Ratio
<i>Private Passenger</i>								
W.....	84,553.6	1,352,856	769,810	2,927	3.46	263	9.10	56.9
X.....	42,660.9	853,215	593,662	1,989	4.66	298	13.92	69.6
Y.....	11,025.1	275,693	205,619	618	5.61	333	18.65	74.6
Total.....	138,239.6	2,481,764	1,569,091	5,534	4.00	284	11.35	63.2
<i>Commercial</i>								
Class 2:								
Heavy ...	4.3	254						
Medium ..	50.0	2,701	185	3	6.00	62	3.70	6.8
Light	98.3	4,325						
Total	152.6	7,280	185	3	1.97	62	1.21	2.5
Class 3:								
Heavy ...	287.6	12,081	8,215	30	10.43	274	28.56	68.0
Medium ..	1,009.0	32,279	21,749	98	9.71	222	21.56	67.4
Light	1,041.2	25,001	18,333	62	5.95	296	17.61	73.3
Total	2,337.8	69,361	48,297	190	8.13	254	20.66	69.6
Class 4:								
Heavy ...	412.2	12,366	7,545	20	4.85	377	18.30	61.0
Medium ..	3,138.3	75,316	47,889	169	5.39	283	15.26	63.0
Light	12,816.1	205,055	108,975	417	3.25	261	8.50	53.1
Total	16,366.6	292,737	164,409	606	3.70	271	10.05	56.2
TOTAL TERRITORY 3								
<i>Public Automobiles</i>								
Specified...	1,239.0	112,247	42,257	166	13.40	255	34.11	37.6
Earnings...	12,221	36,927	11,072	61	.50	182	.91	30.0
Mileage....	2,877	3,599	2,863	11	.004	260	.01	79.5
<i>Garages, Dealers and Manufacturers</i>								
Payroll....	79,261	58,884	33,634	118	.15	285	.42	57.1
Specified...	63.4	1,833	300	1	1.58	300	4.73	16.4
Earnings...	2,791	7,914	3,480	9	.32	387	1.25	44.0
<i>Miscellaneous Classes—Specified Car Basis</i>								
Total	5,719.2	80,382	43,847	113	1.98	338	7.67	54.5

APPENDIX E
MASSACHUSETTS STATUTORY LIABILITY EXPERIENCE
POLICY YEAR 1927

Compiled June, 1928

CLASS	Earned Car Years	Earned Pre- mium	Losses In- curred	No. of Claims	Claim Freq.	Average Claim Cost	Pure Pre- mium	Loss Ratio
<i>Private Passenger</i>								
W.....	45,484.8	1,319,059	1,422,322	6,443	14.17	221	31.27	107.8
X.....	36,576.9	1,353,345	1,163,471	5,515	15.08	211	31.81	86.0
Y.....	10,688.0	480,961	443,955	1,900	17.78	234	41.54	92.3
<i>Total</i>	92,749.7	3,153,365	3,029,748	13,858	14.94	219	32.67	96.1

Commercial

<i>Class 2:</i>								
Heavy ...	2.0	424						
Medium..	79.3	15,394	13,170	77	97.10	171	166.08	85.6
Light	145.0	22,910	11,120	44	30.34	253	76.69	48.5
<i>Total</i>	266.3	38,718	24,290	121	53.47	201	107.34	62.7
<i>Class 3:</i>								
Heavy ...	720.4	108,782	43,266	192	26.65	225	60.06	39.8
Medium..	1,142.6	129,114	73,442	326	28.53	225	64.28	56.9
Light	749.5	63,710	45,534	215	28.69	212	60.75	71.5
<i>Total</i>	2,612.5	301,606	162,242	733	28.06	221	62.10	53.8
<i>Class 4:</i>								
Heavy ...	1,095.6	117,229	45,831	263	24.01	174	41.83	39.1
Medium..	3,874.8	329,360	194,248	914	23.59	213	50.13	59.0
Light	7,814.2	453,224	342,124	1,624	20.78	211	43.78	75.5
<i>Total</i>	12,784.6	899,813	582,203	2,801	21.91	208	45.54	64.7

TOTAL TERRITORY 1 A

Public Automobiles

<i>Specified...</i>	582.2	85,544	33,151	205	35.21	162	56.94	38.8
<i>Earnings...</i>	8,111	31,395	39,570	150	1.70	264	4.49	126.0
<i>Mileage....</i>	265,667	464,918	195,148	1,036	.004	188	.01	42.0

Garages, Dealers and Manufacturers

<i>Payroll....</i>	180,856	253,143	108,107	439	.24	246	.60	42.7
<i>Specified...</i>	111.6	5,236	1,675	7	6.27	239	15.01	32.0
<i>Earnings...</i>	968	3,337	2,225	13	1.34	171	2.30	66.7

Miscellaneous Classes—Specified Car Basis

<i>Total</i>	1,331.7	46,661	37,376	145	10.89	258	23.07	80.1
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APPENDIX F
 MASSACHUSETTS STATUTORY LIABILITY EXPERIENCE
 POLICY YEAR 1927

Compiled June, 1928

CLASS	Earned Car Years	Earned Premium	Losses Incurred	No. of Claims	Claim Freq.	Average Claim Cost	Pure Premium	Loss Ratio
<i>Private Passenger</i>								
W.....	25,962.0	752,899	544,057	2,138	8.24	254	20.96	72.3
X.....	21,988.4	813,571	438,205	1,973	8.97	222	19.93	53.9
Y.....	8,279.3	372,571	212,356	784	9.47	271	25.65	57.0
<i>Total</i>	56,229.7	1,939,041	1,194,618	4,895	8.71	244	21.25	61.6
<i>Commercial</i>								
Class 2:								
Heavy ..	.7	148	88	1	142.86	88	125.71	59.5
Medium..	18.2	3,530	130	2	10.99	65	7.14	3.7
Light ...	32.3	5,104	957	8	24.77	120	29.63	18.8
<i>Total</i>	51.2	8,782	1,175	11	21.48	107	22.95	13.4
Class 3:								
Heavy ..	118.9	17,954	8,542	60	50.46	142	71.84	47.6
Medium..	242.0	27,347	27,372	80	33.06	342	113.11	100.1
Light ...	211.6	17,988	4,447	34	16.07	131	21.02	24.7
<i>Total</i>	572.5	63,289	40,361	174	30.39	232	70.50	63.8
Class 4:								
Heavy ..	242.3	25,925	10,795	31	12.79	348	44.55	41.6
Medium..	778.2	66,149	17,028	98	12.59	174	21.88	25.7
Light ...	2,975.3	172,567	82,669	340	11.43	243	27.79	47.9
<i>Total</i>	3,995.8	264,641	110,492	469	11.74	236	27.65	41.8
<i>Public Automobiles</i>								
<i>Specified..</i>	207.8	26,810	9,403	44	21.17	214	45.25	35.1
<i>Earnings..</i>	4,028	22,531	27,010	46	1.14	587	6.71	119.9
<i>Mileage...</i>	20,044	35,078	10,696	62	.003	173	.01	30.5
<i>Garages, Dealers and Manufacturers</i>								
<i>Payroll ...</i>	58,227	81,486	36,175	147	.25	246	.62	44.4
<i>Specified..</i>	64.4	892	65	1	1.55	65	1.01	7.3
<i>Earnings..</i>	454	1,611	225	2	.44	113	.50	14.0
<i>Miscellaneous Classes—Specified Car Basis</i>								
<i>Total</i>	547.7	16,377	8,892	30	5.48	296	16.24	54.3

TOTAL TERRITORY 1B

APPENDIX G
MASSACHUSETTS STATUTORY LIABILITY EXPERIENCE
POLICY YEAR 1927

Compiled June, 1928

CLASS	Earned Car Years	Earned Premium	Losses Incurred	No. of Claims	Claim Freq.	Average Claim Cost	Pure Premium	Loss Ratio
<i>Private Passenger</i>								
W.....	58,266.2	1,281,854	956,106	4,083	7.01	234	16.41	74.6
X.....	35,391.5	955,575	699,178	3,024	8.54	231	19.76	73.2
Y.....	10,063.0	342,142	251,554	892	8.86	282	25.00	73.5
Total	108,720.7	2,579,571	1,906,838	7,999	7.71	238	18.38	73.9

Commercial

<i>Class 2:</i>								
Heavy ...	6.4	659	181	1	15.63	181	28.28	27.5
Medium ..	65.7	6,175	1,530	5	7.61	306	23.29	24.8
Light	76.1	5,859	4,270	23	30.22	186	56.11	72.9
Total	148.2	12,693	5,981	29	19.57	206	40.36	47.1
<i>Class 3:</i>								
Heavy ...	267.5	19,793	12,188	64	23.93	190	45.56	61.6
Medium ..	657.6	36,177	26,066	107	16.27	244	39.64	72.1
Light	577.3	24,244	17,939	82	14.20	219	31.07	74.0
Total	1,502.4	80,214	56,193	253	16.84	222	37.40	70.1
<i>Class 4:</i>								
Heavy ...	438.8	22,816	17,062	62	14.13	275	38.88	74.8
Medium ..	2,579.6	108,342	71,009	259	10.04	274	27.53	65.5
Light	8,967.3	251,084	143,151	683	7.62	210	15.96	57.0
Total	11,985.7	382,242	231,222	1,004	8.38	230	19.29	60.5

TOTAL TERRITORY 2A

Public Automobiles

<i>Specified...</i>	579.5	66,291	17,088	101	17.43	169	29.49	25.8
<i>Earnings...</i>	5,302	20,829	22,538	67	1.26	336	4.25	108.2
<i>Mileage....</i>	6,639	9,960	3,512	18	.002	195	.01	35.3

Garages, Dealers and Manufacturers

<i>Payroll....</i>	69,548	73,370	61,031	199	.29	307	.88	83.2
<i>Specified...</i>	29.9	925						
<i>Earnings...</i>	561	1,633	72	2	.36	36	.13	4.4

Miscellaneous Classes—Specified Car Basis

<i>Total</i>	2,303.9	49,587	35,297	107	4.64	330	15.32	71.2
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APPENDIX H
 MASSACHUSETTS STATUTORY LIABILITY EXPERIENCE
 POLICY YEAR 1927

Compiled June, 1928

CLASS	Earned Car Years	Earned Premium	Losses Incurred	No. of Claims	Claim Freq.	Average Claim Cost	Pure Premium	Loss Ratio
<i>Private Passenger</i>								
W.....	42,855.7	942,826	598,886	2,411	5.63	248	13.97	63.5
X.....	28,338.0	765,127	438,269	1,823	6.43	240	15.47	57.3
Y.....	8,795.1	299,032	205,006	717	8.15	286	23.31	68.6
<i>Total</i>	79,988.8	2,006,985	1,242,161	4,951	6.19	251	15.53	61.9

<i>Commercial</i>								
TOTAL TERRITORY 2B								
Class 2:								
Heavy ...	4.1	422	1,610	2	48.78	805	392.68	381.5
Medium ..	40.6	3,817	1,910	7	17.24	273	47.04	50.0
Light	71.4	5,500	4,265	7	9.80	605	59.73	77.5
<i>Total</i>	116.1	9,739	7,785	16	13.78	487	67.05	79.9
Class 3:								
Heavy ...	427.5	31,635	23,506	65	15.20	362	54.98	74.3
Medium ..	671.0	36,911	20,011	80	11.92	250	29.82	54.2
Light	565.5	23,751	14,057	61	10.79	230	24.86	59.2
<i>Total</i>	1,664.0	92,297	57,574	206	12.38	279	34.60	62.4
Class 4:								
Heavy ...	494.0	25,687	3,177	27	5.47	118	6.43	12.4
Medium ..	2,568.0	107,854	54,281	223	8.68	243	21.14	50.3
Light	7,459.6	208,870	119,035	633	8.49	188	15.96	57.0
<i>Total</i>	10,521.6	342,411	176,493	883	8.39	200	16.77	61.5

<i>Public Automobiles</i>								
<i>Specified ...</i>	386.9	39,344	32,513	82	21.19	397	84.03	82.6
<i>Earnings ..</i>	5,156	22,742	22,545	61	1.18	370	4.37	99.1
<i>Mileage....</i>	21,318	31,979	33,938	133	.01	255	.02	106.1

<i>Garages, Dealers and Manufacturers</i>								
<i>Payroll</i>	47,719	49,683	23,244	127	.27	183	.49	46.8
<i>Specified ...</i>	57.8	2,350	16	4	6.92	4	.28	.7
<i>Earnings..</i>	259	729						

<i>Miscellaneous Classes—Specified Car Basis</i>								
<i>Total</i>	1,637.5	33,601	27,808	76	4.64	366	16.98	82.8

APPENDIX J
MASSACHUSETTS STATUTORY LIABILITY EXPERIENCE
POLICY YEAR 1927

Compiled June, 1928

CLASS	Earned Car Years	Earned Premium	Losses Incurred	No. of Claims	Claim Freq.	Average Claim Cost	Pure Premium	Loss Ratio
<i>Private Passenger</i>								
W	84,553.6	1,352,856	769,810	2,927	3.46	263	9.10	56.9
X	42,660.9	853,215	593,662	1,989	4.66	298	13.92	69.6
Y	11,025.1	275,693	205,619	618	5.61	333	18.65	74.6
<i>Total</i>	138,239.6	2,481,764	1,569,091	5,534	4.00	284	11.35	63.2

Commercial

<i>Class 2:</i>								
Heavy ...	4.3	254						
Medium ...	50.0	2,701	185	3	6.00	62	3.70	6.8
Light ...	98.3	4,325						
<i>Total</i>	152.6	7,280	185	3	1.97	62	1.21	2.5
<i>Class 3:</i>								
Heavy ...	287.6	12,081	8,215	30	10.43	274	28.56	68.0
Medium ...	1,009.0	32,279	21,749	98	9.71	222	21.56	67.4
Light ...	1,041.2	25,001	18,333	62	5.95	296	17.61	73.3
<i>Total</i>	2,337.8	69,361	48,297	190	8.13	254	20.66	69.6
<i>Class 4:</i>								
Heavy ...	412.2	12,366	7,545	20	4.85	377	18.30	61.0
Medium ...	3,138.3	75,316	47,889	169	5.39	283	15.26	63.0
Light ...	12,816.1	205,055	108,975	417	3.25	261	8.50	53.1
<i>Total</i>	16,366.6	292,737	164,409	606	3.70	271	10.05	56.2

TOTAL TERRITORY 3 MASS. 1927

Public Automobiles

<i>Specified ...</i>	1,239.0	112,247	42,257	166	13.40	255	34.11	37.6
<i>Earnings ...</i>	12,221	36,927	11,072	61	.50	182	.91	30.0
<i>Mileage ...</i>	2,877	3,599	2,863	11	.004	280	.01	79.5

Garages, Dealers and Manufacturers

<i>Payroll ...</i>	79,261	58,884	33,634	118	.15	285	.42	57.1
<i>Specified ...</i>	63.4	1,833	300	1	1.58	300	4.73	16.4
<i>Earnings ...</i>	2,791	7,914	3,480	9	.32	387	1.25	44.0

Miscellaneous Classes—Specified Car Basis

<i>Total</i>	5,719.2	80,382	43,847	113	1.98	388	7.67	54.5
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