

A study of 1929
Motor Bus Operating Cost



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MOTOR BUS OPERATING COSTS

National Association of Motor Bus Operators

Mills Building, Washington, D. C.

During the past three years sufficient information has been broadcast on the subject of motor bus operating costs, by the National Association of Motor Bus Operators through its annual studies, by the American Electric Railway Association through its compilations, and by the industry's excellent trade journals through the publication of articles and operating reports, to provide a general understanding of its major elements; and almost anyone associated with the bus business can now quickly lay out a rough quantitative outline of motor bus expenses.

The demand for a more exact solution, however, is increasing as manufacturing and operating experience bring the finer points of the problem to the surface. That it costs about twenty-five cents a mile to operate a motor coach is no longer a useful piece of information though it is by no means untrue.

Heretofore it has been practically impossible to measure a bus operation by comparing it with others, because the variety in operating conditions has rendered it almost impossible to find those others which would exactly correspond with respect to the various factors affecting costs.

To facilitate comparison, however, this Association's studies had in the past grouped costs into systematic classifications according to the amount of Gross Receipts. The difficulties with such grouping were many and manifest, particularly since there were greater variations in Revenue than in Costs, and Receipts for this reason alone failed as an indicator. A profitable line just within the margin of a particular group may have had very low costs for the average of that group and if it were a large operation it easily distorted that average; while if left on the other side of the margin it disorganized the other. Again, the fact that the companies in a given group were not the same from year to year rendered a running comparison of groups impossible.

METHOD OF PRESENTATION

Clearly some system of standard moving averages was necessary so that an operator could pick a particular place on a line instead of trying to fit his line into a broad group of individual companies peculiarly widely separated from him and from each other in regard to all characteristics including even the selected one of Gross Receipts.

With this in mind and with an excellent sample of the industry's 1929 experience on which to experiment, an attempt was made to find those variable factors common to all bus operation on which costs most greatly depend—aside from the fact that a bus line generally falls into either the City or the Intercity type of operation. The seating capacity of the average bus in the fleet at once presented itself as the dominating influence. A much less important second factor appeared in the number of buses in the fleet. And since there was a correlation between the two, i. e., seating capacity increased with increases in the size of the fleet, the average seating capacity of the fleet here used as the basis of correlation. The statistic, however, may also be interpreted as applying to average buses of the indicated capacities.

The smooth curves represented by these data are not mathematically exact. They are, however, as dependable as the sample on which they are based. Elaborate mathematical procedure was applied to a few of the major items with somewhat disconcerting results. Incongruities in simple curves were due to lack of sufficient sample at certain points. Obtainable complex curves were a nice picture of what did happen to the companies involved during 1929 but were bewildering as a measure of what perhaps should have happened or would be revealed if the sample were larger.

A system of moving weighted averages was adopted. Spots for the totals as well as for most of the sub-totals fell nicely along well-defined curves. Summa-

tion of the readings—which had first been corrected for smoothness—of the major classifications of Revenue and Expense in all four cases fell almost exactly on curves previously obtained for Total Revenues and Total Expenses. Maintenance items and items under Operation similarly checked after very minor and somewhat obviously necessary adjustments. Items under other classifications were more doubtful due to lack of universality in their application; but even in these a necessary adjustment as great as 20 per cent at any point was unusual. Items such as Gasoline Consumption and Bus Mileage were also subjected to cross-checking. Moving averages for Miles per Gallon, Gallons per Bus, and Cost per Gallon, and for Bus Miles per Bus, Costs per Bus Mile and Revenues per Bus Mile were struck and the various curves thus revealed were required to tally with the direct curve sought. On the whole these curves faithfully represent the 1929 operating experience as witnessed by the sample.

VARIATIONS FROM YEAR TO YEAR

Early in the present year the same procedure was used on data concerning 1928 Gasoline Consumption, Gross Revenue, and Bus Mileage. It was thought that the curves found would be more or less permanent. Such was not wholly the case. Changing efficiencies in operation are probably the major cause of variations between the 1929 curves here corresponding to those just mentioned which appeared in the Preliminary Re-

port of the Association's Committee on Taxation and Vehicle Restrictions and in Bus Facts for 1930. These curves perhaps therefore do not represent basic conditions. Those may be found only in time. These simply represent the series of points around which 1929 data having given characteristics tended to center.

Costs and other data are presented in 1929 per bus figures. Wide variations will be noted, and though it must be remembered that there was also wide variation in the 1929 vehicle mileage, the two variations do not offset each other. Per bus mile costs are therefore not given for detailed items. The figures presented, however, are subject to cross manipulation and they afford the basis from which comparison in any but per hour terms may be made.

These figures are in terms of per bus owned in the fleet. In examining them it must be remembered that a constant 23 per cent of Intercity buses and 17 per cent of City buses are standing by for reserve or repairs or special service.

Much tedious labor has been spent on this Study of 1929 Motor Bus Operating Costs, both at the Association's headquarters and by the operating companies who filled out the necessarily difficult questionnaire. It is hoped that it will serve a definite need and that its shortcomings will evoke frank criticism from the industry to the end that its usefulness may be enhanced in the future.

Submitted: WARNER TUFTS.

Approved: JOHN M. MEIGHAN, *Secretary-Manager*.

THE SAMPLE ON WHICH THIS STUDY IS BASED

	In City Operation	In Intercity Operation
Number of Companies Responding.....	41	54
Buses Owned.....	5,549	2,487
Per Cent of Common Carrier Buses in United States.....	12.06	5.30
Miles of Route Served.....	7,325	36,186
Revenue Passengers Carried.....	642,203,296	42,093,130
Number of States Represented.....	24	25*

* There are probably no States into or through which these lines do not operate. They afford an excellent regional distribution.

Average Seats Per Bus	PER BUS OPERATING STATISTICS			PER BUS OPERATING REVENUE IN DOLLARS				
	Average Buses Per Company	Bus Miles Operated	Revenue Passengers Carried	From Passengers	From Charter Service	From Express and Advertising —See Notes—	From All Other Operating Sources	TOTAL OPERATING REVENUE

INTERCITY BUSES

10	10.00	32,200	3,000	4,000	80	15	60	4,155
12.5	13.20	32,518	4,030	5,450	95	66	84	5,695
15	18.00	33,749	5,412	6,900	112	118	108	7,238
17.5	25.71	35,856	7,270	8,350	133	169	131	8,783
20	38.60	38,826	9,765	9,800	157	220	155	10,332
22.5	48.62	42,603	13,116	11,250	187	271	179	11,887
25	56.60	47,278	17,617	12,700	221	323	203	13,447
27.5	58.00	52,982	23,663	14,150	262	374	226	15,012
30	56.67	59,742	31,784	15,600	310	425	250	16,585

CITY BUSES

20	10.00	28,000	37,125	4,455	404	21	300	5,180
22.5	24.45	29,700	53,863	5,925	396	29	242	6,593
25	54.00	31,100	70,996	7,199	349	35	192	7,775
27.5	121.82	32,258	88,146	8,321	289	40	150	8,800
30	196.97	33,180	103,498	9,232	239	44	115	9,630
32.5	260.55	33,865	117,166	10,006	196	47	86	10,335
35	315.06	34,405	128,253	10,645	163	49	63	10,920
37.5	362.29	34,725	137,187	11,167	136	51	46	11,400
40	403.63	34,920	143,685	11,581	114	52	33	11,780
42.5	440.09	34,978	148,021	11,898	95	53	24	12,070
45	472.51	34,920	150,957	12,134	80	54	17	12,285
47.5	501.52	34,770	152,860	12,287	67	55	12	12,421
50	527.62	34,500	153,706	12,355	56	55	9	12,475
52.5	551.24	34,125	153,743	12,358	48	56	7	12,469
55	572.27	33,770	153,021	12,300	40	56	7	12,403

Average Seats Per Bus	PER BUS OPERATING EXPENSE IN DOLLARS								
	Repair Materials for Chassis	Repair Materials for Bodies	Repair Wages for Chassis	Repair Wages for Bodies	Tires and Tubes, Includ- ing Repair	Depreciation Allowed on Buses	Superintend- ence of Maintenance	All Other Maintenance Items	TOTAL MAINTENANCE

INTERCITY BUSES

10	158	62	129	41	400	800	20	15	1,625
12.5	201	79	147	46	431	970	53	36	1,963
15	254	101	182	57	463	1,107	81	58	2,303
17.5	322	128	233	73	494	1,220	104	79	2,653
20	415	165	309	97	525	1,318	124	100	3,053
22.5	523	207	413	130	556	1,403	142	121	3,495
25	666	264	557	176	588	1,479	157	143	4,030
27.5	838	332	743	235	619	1,547	172	164	4,650
30	1,074	426	999	316	650	1,609	185	185	5,444

CITY BUSES

20	246	59	115	35	265	1,205	10	350	2,285
22.5	302	68	191	59	315	1,115	40	332	2,492
25	354	75	274	86	355	1,165	68	314	2,691
27.5	401	80	353	112	385	1,145	93	295	2,864
30	442	84	413	132	407	1,125	115	277	2,995
32.5	476	88	453	147	423	1,105	131	259	3,082
35	506	90	483	158	434	1,085	141	241	3,138
37.5	529	93	505	168	441	1,065	146	223	3,170
40	549	95	523	175	445	1,045	148	204	3,184
42.5	565	97	535	182	447	1,025	147	186	3,184
45	578	99	544	187	448	1,005	144	168	3,173
47.5	590	100	550	191	449	985	139	150	3,154
50	599	102	553	195	449	965	132	131	3,126
52.5	608	103	555	198	449	945	123	113	3,094
55	615	105	556	200	449	925	111	95	3,056

Average Seats Per Bus	PER BUS OPERATING EXPENSE IN DOLLARS										
	Gasoline Used in Buses		Lubricants Used in Buses	Wages of General Garage Employees	All Other Operation Items	TOTAL OPERATION	Wages of Drivers and Conductors	Wages of Station Employees	Superintend- ence of Transportation	All Other Transportation Items	TOTAL TRANSPOR- TATION
	Gallons	Cost									

INTERCITY BUSES

10	2,800	540	75	80	40	735	750	236	70	59	1,115
12.5	3,405	614	88	163	51	916	1,005	248	85	77	1,415
15	4,141	697	104	230	72	1,103	1,209	290	104	107	1,710
17.5	5,036	792	123	285	100	1,300	1,379	338	127	150	1,994
20	6,124	900	145	333	134	1,512	1,525	383	154	201	2,263
22.5	7,448	1,023	171	375	172	1,741	1,653	415	188	259	2,515
25	9,057	1,162	201	412	214	1,989	1,766	434	229	320	2,749
27.5	11,015	1,320	238	445	254	2,257	1,868	433	279	382	2,962
30	13,395	1,501	280	475	288	2,544	1,961	422	340	433	3,156

CITY BUSES

20	4,500	551	80	250	120	1,001	1,130		90	80	1,300
22.5	5,524	666	100	305	140	1,211	1,500		154	103	1,757
25	6,500	772	117	345	156	1,390	1,825		212	126	2,163
27.5	7,425	871	131	371	169	1,542	2,110		264	149	2,523
30	8,295	963	142	381	179	1,665	2,360		310	172	2,842
32.5	9,100	1,047	151	382	187	1,767	2,580		350	195	3,125
35	9,835	1,123	157	377	193	1,850	2,770		385	218	3,373
37.5	10,500	1,191	163	368	198	1,920	2,935		415	237	3,587
40	11,080	1,249	167	356	202	1,974	3,075		441	256	3,772
42.5	11,581	1,298	170	341	205	2,014	3,190		464	272	3,926
45	11,993	1,338	173	324	207	2,042	3,285		484	287	4,056
47.5	12,303	1,366	175	305	209	2,055	3,360		502	300	4,162
50	12,525	1,384	177	284	209	2,054	3,415		518	311	4,244
52.5	12,679	1,394	179	260	209	2,042	3,450		533	319	4,302
55	12,760	1,397	181	235	209	2,022	3,475		547	325	4,347

Few Isolated Instances
Included Under All Other
Transportation Items

Average Seats Per Bus	PER BUS OPERATING EXPENSE IN DOLLARS								
	Advertising and Promotional Printing	All Other Promotion Items	TOTAL PROMOTION	Administrative and Office Salaries	Office Supplies	Insurance Against Claims (Injuries and Damages)	Property Insurance	Employee Insurance	All Other Administrative or General Items

INTERCITY BUSES

10	51	49	100	220	38	190	36	44	70	598
12.5	69	63	132	262	53	223	41	42	90	711
15	93	80	173	313	69	262	46	41	114	845
17.5	126	102	228	373	84	308	53	39	146	1,003
20	171	129	300	445	99	362	60	37	187	1,190
22.5	231	165	396	531	114	426	68	35	239	1,413
25	312	209	521	633	130	500	77	34	306	1,680
27.5	422	264	686	755	145	588	88	32	391	1,999
30	570	333	903	900	160	690	100	30	500	2,380

CITY BUSES

20	127	21	148	230	21	220	40	20	20	560
22.5	97	29	126	224	26	328	51	25	70	724
25	73	29	102	218	30	428	52	29	115	872
27.5	55	23	78	213	34	512	54	30	156	1,002
30	40	16	56	208	37	572	55	37	190	1,099
32.5	29	12	41	205	41	612	57	40	210	1,165
35	23	9	32	203	43	642	58	43	223	1,212
37.5	19	7	26	202	46	662	60	46	230	1,246
40	16	6	22	198	48	676	61	48	236	1,267
42.5	14	5	19	196	50	686	63	50	240	1,285
45	12	5	17	196	52	696	64	52	244	1,304
47.5	11	4	15	196	53	706	66	53	248	1,322
50	10	4	14	196	54	716	67	54	252	1,339
52.5	10	3	13	196	55	726	69	55	256	1,357
55	9	3	12	196	55	736	70	55	260	1,372

Average Seats Per Bus	PER BUS OPERATING EXPENSE IN DOLLARS								PER BUS INVESTMENT		
	Rent of Extra Buses	Rent of Other Property	TOTAL RENT	Gasoline Tax	State Special Taxes	State General Taxes	All Local Taxes	TOTAL TAXES	TOTAL OPERATING EXPENSE	Investment in Buses	Investment in Other Property

INTERCITY BUSES

10	27	125	152	85	60	28	20	193	4,518	3,250	4,860	8,110
12.5	38	144	182	104	128	31	25	288	5,607	4,655	4,860	9,515
15	55	167	222	126	195	34	30	385	6,741	5,779	4,860	10,639
17.5	78	192	270	153	263	37	35	488	7,936	6,716	4,860	11,576
20	111	222	333	186	330	40	40	596	9,247	7,519	4,860	12,379
22.5	158	257	415	227	398	43	45	713	10,688	8,222	4,860	13,082
25	225	296	521	276	465	46	50	837	12,327	8,847	4,860	13,707
27.5	320	342	662	335	532	49	55	971	14,187	9,409	4,860	14,269
30	455	395	850	408	600	52	60	1,120	16,397	9,920	4,860	14,780

CITY BUSES

20	7	108	115	117	280	40	100	537	5,946	6,000	150	6,150
22.5	11	112	123	144	238	41	160	583	7,016	7,300	446	7,746
25	15	115	130	169	202	41	206	618	7,966	8,100	743	8,843
27.5	19	119	138	193	173	42	241	649	8,796	8,620	1,039	9,659
30	23	122	145	216	149	43	266	674	9,476	8,960	1,336	10,296
32.5	27	126	153	237	130	43	285	695	10,028	9,180	1,632	10,812
35	31	129	160	256	116	44	300	716	10,481	9,320	1,929	11,249
37.5	35	133	168	273	106	45	311	735	10,852	9,390	2,225	11,615
40	39	136	175	288	98	45	319	750	11,144	9,405	2,521	11,926
42.5	43	140	183	301	92	46	325	764	11,375	9,375	2,818	12,193
45	47	143	190	312	87	46	330	775	11,557	9,305	3,114	12,419
47.5	51	147	198	321	84	47	335	787	11,693	9,210	3,411	12,621
50	55	150	205	328	81	48	340	797	11,779	9,090	3,707	12,797
52.5	59	154	213	332	79	48	345	804	11,825	8,955	4,004	12,959
55	63	157	220	333	77	49	350	809	11,838	8,795	4,300	13,095

Average Seats Per Bus	REVENUE AND EXPENSE PER BUS MILE									OPERATING RATIOS	
	TOTAL OPERATING REVENUE	TOTAL MAINTENANCE	TOTAL OPERATION	TOTAL TRANSPORTATION	TOTAL PROMOTION	TOTAL GENERAL	TOTAL RENT	TOTAL TAXES	TOTAL OPERATING EXPENSES	Expenses in Per Cent of Revenue	Operating Net in Per Cent of Investment

INTERCITY BUSES

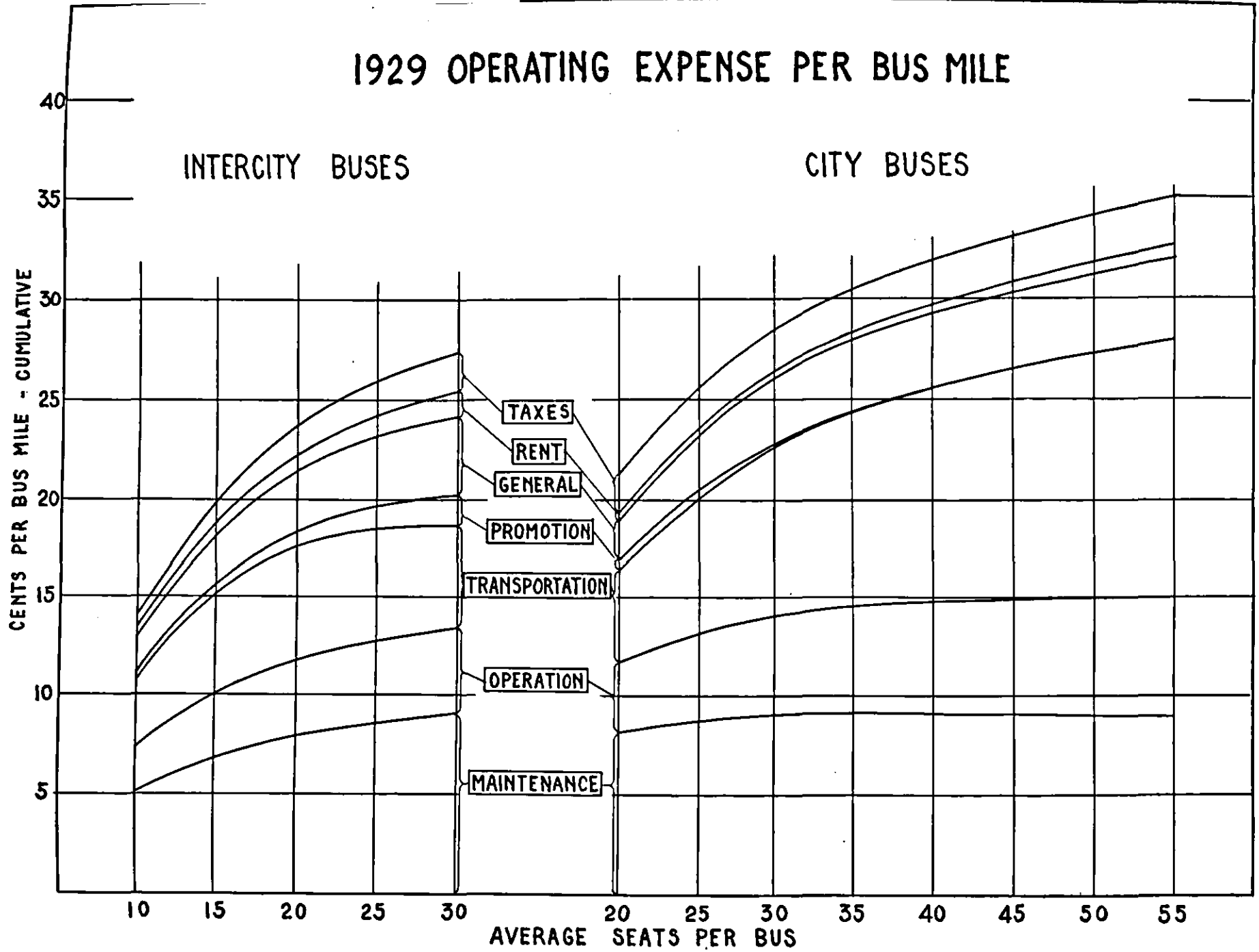
10	12.90	5.05	2.28	3.46	.81	1.86	.47	.60	14.03	108.74	
12.5	17.51	6.03	2.82	4.34	.41	2.19	.56	.89	17.24	99.08	+
15	21.45	6.82	3.27	5.07	.51	2.50	.66	1.14	19.97	93.13	+
17.5	24.50	7.39	3.63	5.56	.64	2.80	.75	1.36	22.13	90.36	+
20	26.61	7.86	3.89	5.83	.77	3.06	.86	1.54	23.81	89.50	+
22.5	27.90	8.20	4.09	5.90	.93	3.32	.97	1.67	25.08	89.91	+
25	28.44	8.52	4.21	5.81	1.10	3.55	1.10	1.77	26.06	91.67	+
27.5	28.33	8.78	4.26	5.59	1.29	3.77	1.25	1.83	26.77	94.50	+
30	27.76	9.12	4.26	5.29	1.51	3.98	1.42	1.87	27.45	98.87	+

CITY BUSES

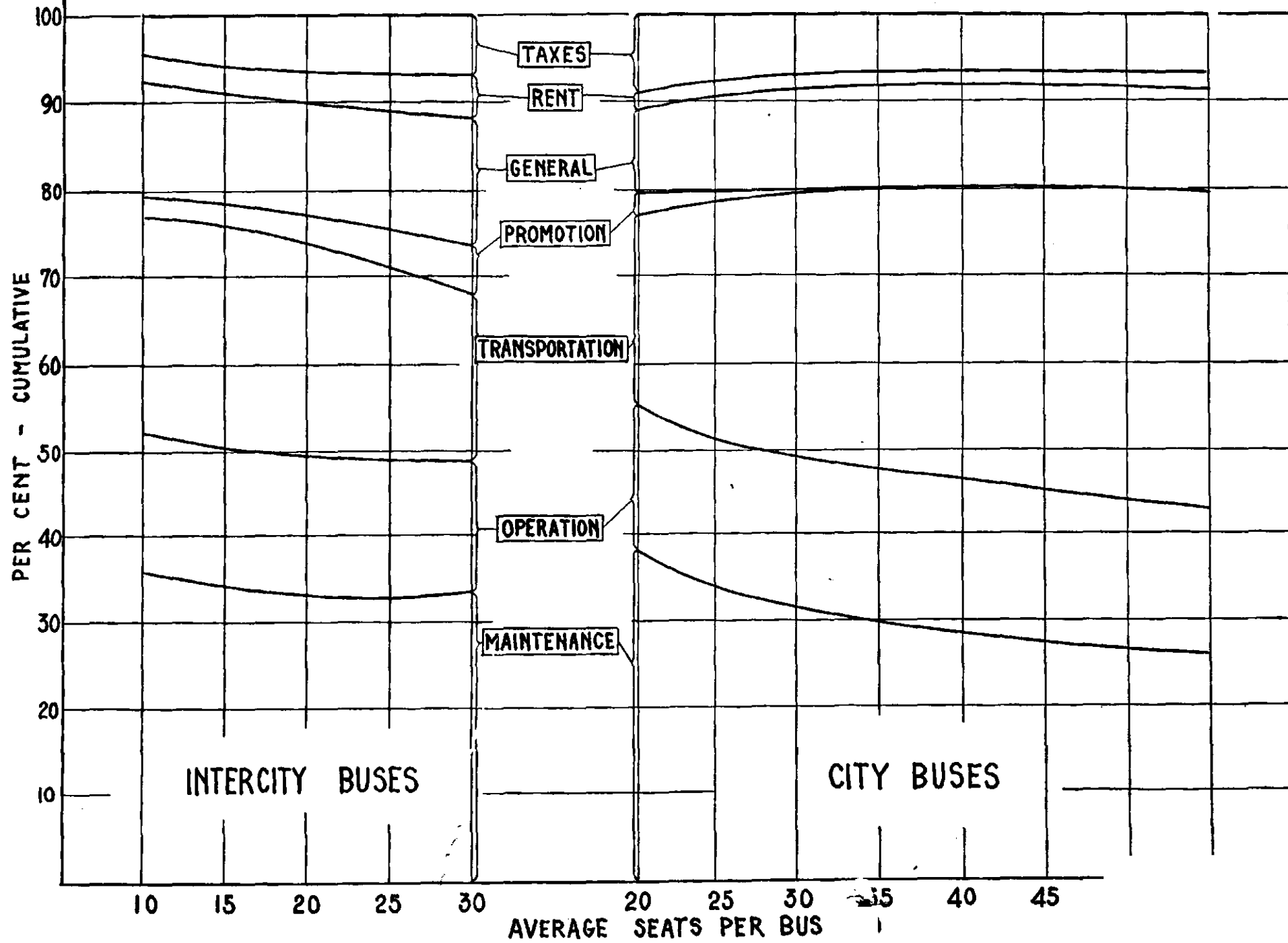
20	18.50	8.16	3.58	4.64	.53	2.00	.41	1.92	21.24	114.79	-
22.5	22.20	8.39	4.08	5.92	.42	2.44	.41	1.96	23.62	106.42	-
25	25.00	8.65	4.47	6.95	.33	2.80	.42	1.99	25.61	102.46	-
27.5	27.28	8.88	4.78	7.82	.24	3.11	.43	2.01	27.27	99.95	+
30	29.02	9.03	5.02	8.56	.17	3.31	.44	2.03	28.56	98.40	+
32.5	30.52	9.10	5.22	9.23	.12	3.44	.45	2.05	29.61	97.03	+
35	31.74	9.12	5.38	9.80	.09	3.52	.47	2.08	30.46	95.98	+
37.5	32.83	9.13	5.53	10.33	.07	3.59	.48	2.12	31.25	95.19	+
40	33.73	9.12	5.65	10.80	.06	3.63	.50	2.15	31.91	94.60	+
42.5	34.51	9.11	5.76	11.23	.05	3.67	.52	2.18	32.52	94.24	+
45	35.18	9.09	5.85	11.62	.05	3.73	.54	2.22	33.10	94.07	+
47.5	35.72	9.07	5.91	11.97	.04	3.80	.57	2.26	33.62	94.14	+
50	36.16	9.06	5.95	12.29	.04	3.88	.59	2.31	34.14	94.42	+
52.5	36.54	9.06	5.98	12.61	.04	3.98	.62	2.36	34.65	94.84	+
55	36.78	9.05	5.99	12.87	.04	4.06	.65	2.40	35.06	95.44	+

1929 OPERATING EXPENSE PER BUS MILE

[9]



1929 OPERATING EXPENSES IN PER CENT OF TOTAL



[7]